

---

**User's  
Manual**

**AXFA14G/C  
Magnetic Flowmeter Remote Converter  
[Hardware Edition/Software Edition]**

**ADMAG AXF™**

**AXF  
Magnetic Flowmeter  
Integral Flowmeter  
[Software Edition]**

IM 01R20C02-01E-E

---

**vigilantplant.™**



# Contents

|                                                                      |            |
|----------------------------------------------------------------------|------------|
| <b>1. INTRODUCTION .....</b>                                         | <b>1-1</b> |
| 1.1 Using the Magnetic Flowmeter Safely .....                        | 1-2        |
| 1.2 Warranty .....                                                   | 1-3        |
| 1.3 Combination Remote Flowtubes .....                               | 1-3        |
| 1.4 ATEX Documentation .....                                         | 1-4        |
| <b>2. HANDLING PRECAUTIONS .....</b>                                 | <b>2-1</b> |
| 2.1 Checking Model and Specifications .....                          | 2-1        |
| 2.2 Accessories .....                                                | 2-1        |
| 2.3 Storage Precautions .....                                        | 2-1        |
| 2.4 Installation Location Precautions .....                          | 2-2        |
| <b>3. INSTALLATION .....</b>                                         | <b>3-1</b> |
| 3.1 Installation Location .....                                      | 3-1        |
| 3.2 Mounting .....                                                   | 3-1        |
| <b>4. WIRING .....</b>                                               | <b>4-1</b> |
| 4.1 Wiring Precautions .....                                         | 4-1        |
| 4.2 Cables .....                                                     | 4-1        |
| 4.3 Wiring Ports .....                                               | 4-3        |
| 4.4 Wiring Connections .....                                         | 4-4        |
| 4.4.1 Removing Cover .....                                           | 4-4        |
| 4.4.2 Terminal Configuration .....                                   | 4-4        |
| 4.4.3 Precautions for Wiring of Power Supply Cables .....            | 4-4        |
| 4.4.4 DC Power Connection .....                                      | 4-5        |
| 4.4.5 Grounding .....                                                | 4-5        |
| 4.4.6 Wiring the Remote Flowtube with AXFA14 Converter .....         | 4-6        |
| 4.4.7 Connecting to External Instruments .....                       | 4-7        |
| 4.4.8 Installing the Cover .....                                     | 4-8        |
| <b>5. BASIC OPERATING PROCEDURES .....</b>                           | <b>5-1</b> |
| 5.1 Operating Panel Configuration and Functions .....                | 5-1        |
| 5.2 Display Unit Setting Methods .....                               | 5-2        |
| 5.2.1 Display Mode → Setting Mode .....                              | 5-2        |
| 5.2.2 Setting Mode .....                                             | 5-4        |
| 5.3 Parameter Setting Procedure .....                                | 5-4        |
| 5.3.1 Setting Example for Selection-Type Data: Flow rate units ..... | 5-4        |
| 5.3.2 Setting Example for Numeric-Type Data: Flow-rate span .....    | 5-6        |
| 5.3.3 Setting Example for Alphanumeric-Type Data: Tag number .....   | 5-7        |

|                                                                     |            |
|---------------------------------------------------------------------|------------|
| <b>6. PARAMETER DESCRIPTION .....</b>                               | <b>6-1</b> |
| 6.1 Parameters .....                                                | 6-1        |
| 6.2 Parameter Lists .....                                           | 6-1        |
| 6.3 Parameter List Overview .....                                   | 6-2        |
| 6.4 Parameter Description .....                                     | 6-12       |
| (1) Menu B: Easy Setup items .....                                  | 6-12       |
| (2) Menu C: Basic Setting items .....                               | 6-15       |
| (3) Menu D: Total Setting items .....                               | 6-17       |
| (4) Menu E: Pulse Setting items .....                               | 6-18       |
| (5) Menu F: Status Functions Setting items .....                    | 6-19       |
| (6) Menu G: Alarm Setting items .....                               | 6-25       |
| (7) Menu H: Display Setting items .....                             | 6-29       |
| (8) Menu J: Auxiliary Function Setting items .....                  | 6-29       |
| (9) Menu K: Diagnostic Function Setting items .....                 | 6-32       |
| (10) Menu M: Automatic Zero Adjustment Function Setting items ..... | 6-32       |
| (11) Menu N: Loop Test (Output Test) Setting items .....            | 6-33       |
| (12) Menu P: Parameter Protection password items .....              | 6-33       |
| 6.5 Alarm Functions .....                                           | 6-34       |
| 6.5.1 Alarm Levels .....                                            | 6-34       |
| 6.5.2 Alarm Selection .....                                         | 6-35       |
| 6.5.3 Alarms & Warning Messages .....                               | 6-37       |
| 6.6 Precautions for the AXF Integral Flowmeter .....                | 6-39       |
| <b>7. OPERATION VIA BRAIN TERMINAL (BT200) .....</b>                | <b>7-1</b> |
| 7.1 BT200 Basic Operations .....                                    | 7-1        |
| 7.1.1 Key Layout and Display .....                                  | 7-1        |
| 7.1.2 Key Descriptions .....                                        | 7-1        |
| 7.2 AXFA14 Operation Using a BT200 .....                            | 7-3        |
| 7.2.1 BT200 Connection .....                                        | 7-3        |
| 7.2.2 The data update and upload/download function of BT200 .....   | 7-3        |
| 7.2.3 BT200 Panels & Flow Data Display .....                        | 7-4        |
| 7.3 Parameter Setting Using a BT200 .....                           | 7-4        |
| 7.3.1 BT200 Setting of Selection-Type Data: Flow-rate units .....   | 7-4        |
| 7.3.2 BT200 Setting of Numeric-Type Data: Flow-rate span .....      | 7-5        |
| 7.3.3 BT200 Setting of Alphanumeric-Type Data: Tag number .....     | 7-6        |

|                                                                  |             |
|------------------------------------------------------------------|-------------|
| <b>8. OPERATION VIA HART COMMUNICATOR .....</b>                  | <b>8-1</b>  |
| 8.1 Conditions of Communication Line .....                       | 8-2         |
| 8.1.1 Interconnection between AXFA14 and HART Communicator ..... | 8-2         |
| 8.1.2 Communication Line Requirements .....                      | 8-2         |
| 8.2 Basic Operation of the HART Communicator (Model 275) .....   | 8-3         |
| 8.2.1 Keys and Functions .....                                   | 8-3         |
| 8.2.2 Display .....                                              | 8-4         |
| 8.2.3 Calling Up Menu Addresses .....                            | 8-4         |
| 8.2.4 Entering, Setting and Sending Data .....                   | 8-5         |
| 8.3 Parameters .....                                             | 8-5         |
| 8.3.1 Parameter Configuration .....                              | 8-5         |
| 8.3.2 Data Renewing .....                                        | 8-5         |
| 8.3.3 Checking for Problems .....                                | 8-6         |
| 8.3.4 Setting Parameters .....                                   | 8-6         |
| 8.3.5 Menu Tree .....                                            | 8-21        |
| <b>9. ACTUAL OPERATION .....</b>                                 | <b>9-1</b>  |
| 9.1 Pre-operation Zero Adjustment .....                          | 9-1         |
| 9.1.1 Zero Adjustment Using the infra red Switches .....         | 9-2         |
| 9.1.2 Zero Adjustment via External Status Input .....            | 9-3         |
| <b>10. MAINTENANCE .....</b>                                     | <b>10-1</b> |
| 10.1 Components Replacement .....                                | 10-1        |
| 10.1.1 Fuse Replacement .....                                    | 10-1        |
| 10.1.2 Display Unit Replacement .....                            | 10-2        |
| 10.1.3 Amplifier Replacement .....                               | 10-3        |
| 10.2 Setting of Switches .....                                   | 10-4        |
| 10.2.1 Setting of Burnout Switch .....                           | 10-4        |
| 10.2.2 Setting of Write Protect Switch .....                     | 10-4        |
| 10.3 Troubleshooting .....                                       | 10-5        |
| 10.3.1 No Indication .....                                       | 10-5        |
| 10.3.2 Unstable Zero .....                                       | 10-6        |
| 10.3.3 Disagreement Between Indication and Actual Flow .....     | 10-7        |
| <b>11. OUTLINE .....</b>                                         | <b>11.1</b> |
| <b>12. HAZARDOUS DUTY TYPE INSTRUMENTS .....</b>                 | <b>12-1</b> |
| 12.1 ATEX (KEMA) .....                                           | 12-1        |
| 12.2 FM .....                                                    | 12-3        |
| 12.3 CSA .....                                                   | 12-4        |
| 12.4 IECEx .....                                                 | 12-5        |

## CONTENTS

# 1. INTRODUCTION

This instrument has been adjusted at the factory before shipment.

To ensure correct use of the instrument, please read this manual thoroughly and fully understand how to operate the instrument before operating it.



## NOTE

This manual describes the hardware and software configurations of the AXFA14 converter and the software configuration of the AXF integral flowmeter.

The contents of “basic operating procedures”, “parameter description”, “operation via BRAIN terminal (BT200)”, “operation via HART communicator”, and “actual operation” for the AXF integral flowmeter are the same as the AXFA14, see Chapter 5 to 9 in this manual.

For the hardware configuration of the AXF integral flowmeter, see the user's manual of the AXF Integral Flowmeter/Remote Flowtube [Hardware Edition] (IM 01R20D01-01E-E). For FOUNDATION Fieldbus protocol (Output Signal and Communication suffix code "F") please refer to IM 01E20F02-01E.

## Regarding This User's Manual

- This manual should be provided to the end user.
- Before use, read this manual thoroughly to comprehend its contents.
- The contents of this manual may be changed without prior notice.
- All rights are reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- Yokogawa makes no warranty of any kind with regard to this material, including, but not limited to, implied warranties of merchantability and suitability for a particular purpose.
- All reasonable effort has been made to ensure the accuracy of the contents of this manual. However, if any errors or omissions are found, please inform Yokogawa.
- Yokogawa assumes no responsibilities for this product except as stated in the warranty.

- Please note that this user's manual may not be revised for any specification changes, construction changes or operating part changes that are not considered to affect function or performance.
- If the customer or any third party is harmed by the use of this product, Yokogawa assumes no responsibility for any such harm owing to any defects in the product which were not predictable, or for any indirect damages.



## NOTE

Please refer to manual IM 01R20D01-01E-E for information of the AXF Remote Flowtube.

## Safety and Modification Precautions

- The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Yokogawa assumes no liability for the customer's failure to comply with these requirements. If this instrument is used in a manner not specified in this manual, the protection provided by this instrument may be impaired.
- The following safety symbol marks are used in this user's manual and instrument.



## WARNING

A WARNING sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death of personnel.



## CAUTION

A CAUTION sign denotes a hazard. It calls attention to procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.



## IMPORTANT

An IMPORTANT sign denotes that attention is required to avoid damage to the instrument or system failure.



## NOTE

A NOTE sign denotes information necessary for essential understanding of operation and features.



Protective grounding terminal



Functional grounding terminal

(This terminal should not be used as a protective grounding terminal.)



Alternating current



Direct current

## 1.1 Using the Magnetic Flowmeter Safely



## WARNING

### (1) Installation

- Installation of the magnetic flowmeter must be performed by expert engineers or skilled personnel. No operator shall be permitted to perform procedures relating to installation.
- The magnetic flowmeter is a heavy instrument. Be careful that no damage is caused to personnel through accidentally dropping it, or by exerting excessive force on the magnetic flowmeter. When moving the magnetic flowmeter, always use a trolley and have at least two people carry it.
- When the magnetic flowmeter is processing hot fluids, the instrument itself may become extremely hot. Take sufficient care not to get burned.
- Where the fluid being processed is a toxic substance, avoid contact with the fluid and avoid inhaling any residual gas, even after the instrument has been taken off the line for maintenance and so forth.
- Do not apply excessive weight, for example, a person stepping on the magnetic flowmeter.

- All procedures relating to installation must comply with the electrical code of the country where it is used.

### (2) Wiring

- The wiring of the magnetic flowmeter must be performed by expert engineers or skilled personnel. No operator shall be permitted to perform procedures relating to wiring.
- When connecting the wiring, check that the supply voltage is within the range of the voltage specified for this instrument before connecting the power cable. In addition, check that no voltage is applied to the power cable before connecting the wiring.
- The protective grounding must be connected securely at the terminal with the  mark to avoid danger to personnel.

### (3) Operation

- Do not open the cover until the power has been off for at least 10 min. Only expert engineers or skilled personnel are permitted to open the cover.

### (4) Maintenance

- Maintenance on the magnetic flowmeter should be performed by expert engineers or skilled personnel. No operator shall be permitted to perform any operations relating to maintenance.
- Always conform to maintenance procedures outlined in this manual. If necessary, contact Yokogawa.

- Care should be taken to prevent the build up of dirt, dust or other substances on the display panel glass or data plate. If these surfaces get dirty, wipe them clean with a soft dry cloth.

### (5) Hazardous Duty Type Instruments

- Magnetic flowmeters with the model name AXFA14C are products which have been certified as explosion proof type instruments. Strict limitations are applied to the structures, installation locations, external wiring work, maintenance and repairs, etc. of these instruments. Sufficient care must be taken, as any violation of the limitations may cause dangerous situations.
- For explosion proof type instruments the description in chapter 12 "HAZARDOUS DUTY TYPE INSTRUMENTS" has priority to the other descriptions in this instruction manual.
- Only trained personnel should install and maintain instruments in hazardous areas.
- The protective grounding terminal  must be connected to a suitable IS grounding system.
- Avoid mechanical generated sparks while working on the equipment and peripheral devices in hazardous areas.

## 1.2 Warranty

- The warranty terms of this instrument that are guaranteed are described in the quotation. We will make any repairs that may become necessary during the guaranteed term free of charge.
- Please contact our sales office if this instrument requires repair.
- If the instrument is faulty, contact us with concrete details about the problem and the length of time it has been faulty, and state the model and serial number. We would appreciate the inclusion of drawings or additional information.
- The results of our examination will determine whether the meter will be repaired free of charge or on an at-cost basis.

### The guarantee will not apply in the following cases:

- Damage due to negligence or insufficient maintenance on the part of the customer.
- Problems or damage resulting from handling, operation or storage that violates the intended use and specifications.
- Problems that result from using or performing maintenance on the instrument in a location that does not comply with the installation location specified by Yokogawa.
- Problems or damage resulting from repairs or modifications not performed by Yokogawa or someone authorized by Yokogawa.
- Problems or damage resulting from inappropriate installation after delivery.
- Problems or damage resulting from disasters such as fires, earthquakes, storms, floods, or lightning strikes and external causes.
- All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you should contact your nearest Yokogawa office or representative.

## 1.3 Combination Remote Flowtubes



### IMPORTANT

- The AXFA14 Magnetic Flowmeter Converter should be used in combination with the following remote flowtubes:

AXF002 □-P to AXF400□ -P

Other flowtubes cannot be used with the AXFA14.

- If the converter combined with the AXF magnetic flowmeter remote flowtube is changed from the AXFA11 to AXFA14 or vice versa, the meter factor of the remote flowtube must be readjusted according to its flow calibration.



### CAUTION

In case of combination with explosion proof Style flowtube(AXF□□□ C-P), please see the manual IM 01R20D01-01E-E. The construction of the instrument, installation, external wiring, maintenance and repair are strictly restricted, and non-observance or negligence of these restriction would result dangerous condition.

## 1.4 ATEX Documentation

This procedure is only applicable to the countries in European Union.

GB

All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.

DK

Alle brugervejledninger for produkter relateret til ATEX Ex er tilgængelige på engelsk, tysk og fransk. Skulle De ønske yderligere oplysninger om håndtering af Ex produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.

I

Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese, tedesco e francese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

E

Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés, alemán y francés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.

NL

Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels, Duits en Frans. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.

SF

Kaikkien ATEX Ex -tyyppisten tuotteiden käyttöohjeet ovat saatavilla englannin-, saksan- ja ranskankielisinä. Mikäli tarvitsette Ex -tyyppisten tuotteiden ohjeita omalla paikallisella kielellänne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.

P

Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês, Alemão e Francês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.

F

Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise, allemande et française. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.

D

Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch, Deutsch und Französisch zur Verfügung. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichen Yokogawa-Vertreter in Verbindung.

S

Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska, tyska och franska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.

GR

Όλα τα εγχειρίδια λειτουργίας των προϊόντων με ATEX Ex διατίθενται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπροσωπο της.

SK

Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom, nemeckom a francúzskom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, kontaktujte prosím miestnu kanceláriu firmy Yokogawa.

CZ

Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.

LT

Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø, vokieèiø ir prancûzø kalbomis. Norëdami gauti prietaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës “Yokogawa” biuru arba atstovu.

LV

Visas ATEX Ex kategorijas izstrādājumu Lietošanas instrukcijas tiek piegādātas angļu, vācu un franču valodās. Ja vēlaties saņemt Ex ierīšu dokumentāciju citā valodā, Jums ir jāsazinās ar firmas Yokogawa (Yokogawa) tuvāko ofisu vai pārstāvi.

EST

Kõik ATEX Ex toodete kasutamishendid on esitatud inglise, saksa ja prantsuse keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima lokagava (Yokogawa) kontori või esindaja poole.

PL

Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja obsługi w Państwa lokalnym języku, prosimy o kontakt z najbliższym biurem Yokogawy.

SLO

Vsi predpisi in navodila za ATEX Ex sorodni pridelki so pri roki v angleščini, nemščini ter francoščini. Če so Ex sorodna navodila potrebna v vašem tujejnem jeziku, kontaktirajte vaš najbližji Yokogawa office ili predstavnika.

H

Az ATEX Ex műszerek gépkönyveit angol, német és francia nyelven adjuk ki. Amennyiben helyi nyelven kérlek az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviselőtet.

BG

Всички упътвания за продукти от серията ATEX Ex се предлагат на английски, немски и френски език. Ако се нуждаете от упътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.

RO

Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza, germana si franceza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.

M

Il-manwali kollha ta' l-istruzzjonijiet għal prodotti marbuta ma' ATEX Ex huma disponibbli bil-Ingliż, bil-Ġermaniż u bil-Franċiż. Jekk tkun teħtieġ struzzjonijiet marbuta ma' Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentant jew ufficċju ta' Yokogawa.

## 1. INTRODUCTION

## 2. HANDLING PRECAUTIONS

This instrument has been inspected carefully at the factory before shipment. When the instrument is delivered, visually check that no damage has occurred during transportation.

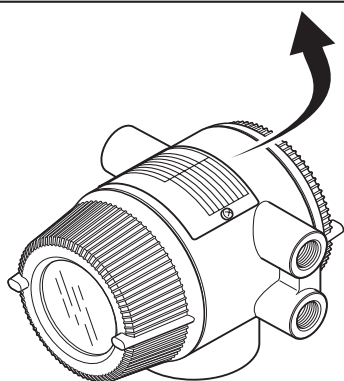
Read this section carefully as it contains important information on handling this instrument. Refer to the relevant sections for information not contained in this section. If you have any problems or questions, please contact Yokogawa sales office.

### 2.1 Checking Model and Specifications

The model code and specifications are found on the data plate located on the outside of the case. Check that the model code and specifications match what you have ordered.

Be sure you have your model number and serial number available when contacting Yokogawa.

|                                       |                       |           |              |
|---------------------------------------|-----------------------|-----------|--------------|
| <b>ADMAG AXF</b> ™ MAGNETIC FLOWMETER |                       | OUTPUT    | mA (0-7500)  |
|                                       |                       |           | VDC 0.2A MAX |
| MODEL                                 |                       | AMB. TEMP | °C           |
| SUFFIX                                |                       | TAG. NO.  |              |
|                                       |                       | NO.       |              |
|                                       |                       | COMB. NO. |              |
| STYLE                                 |                       |           |              |
| SUPPLY                                | VDC 12W               |           |              |
|                                       | VAC- 50/60Hz 30VA 12W |           |              |
| YOKOGAWA ♦ Made in ____               |                       | CE        |              |



F0201.EE

Figure 2.1.1 Data Plate

### 2.2 Accessories

Check that the parts shown below are included in the package:

- Spare fuse: 1 piece (Use only specified fuse as spare part for this product)  
T2A , 250V , Time lag / slow blow , 2.5A
- Hexagonal wrench: 1 piece (nominal size 3 mm)
- Mounting hardware: 1 set

### 2.3 Storage Precautions

If the instrument is to be stored for a long period of time after delivery, observe the following points.

- The instrument should be stored in its original packing condition in the storage location.
- Select a storage location that fulfils the following conditions:
  - A place where it will not be exposed to rain or water
  - A place subject to minimal vibrations or shocks
  - Temperature and humidity levels should be as follows:
    - Temperature: -30 to 70 °C
    - Humidity: 5 to 80 % RH (no condensation)
    - The preferred ambient temperature and humidity levels are 25 °C and approximately 65 % RH.
- If the AXFA14 converter is transferred to the installation site and stored without being installed, its performance may be impaired due to the infiltration of rainwater and so forth. Be sure to install and wire the AXFA14 as soon as possible after transferring it to the installation location.

## 2.4 Installation Location Precautions

Select the installation location with consideration to the following items to ensure long-term stable operation of the instrument.

- **Ambient Temperature:**  
Avoid installing the instrument in locations with constantly fluctuating temperatures. If the location is subject to radiant heat from the plant, provide heat insulation or improve ventilation.
- **Atmospheric Condition:**  
Avoid installing the instrument in a corrosive atmosphere. In situations where this is unavoidable, consider ways to improve ventilation and to prevent rainwater from entering and being retained in the conduit pipes.
- **Vibrations or Shocks:**  
Avoid installing the instrument in a place subject to shocks or vibrations.
- **Hazardous Duty Type:**  
Explosion protected types can be installed in hazardous areas according to the types of gases for which they are certified. See the description in CHAPTER 12 "HAZARDOUS DUTY TYPE INSTRUMENTS" in this user's manual.

## 3. INSTALLATION



### WARNING

Installation of the magnetic flowmeter must be performed by expert engineers or skilled personnel. No operator shall be permitted to perform procedures relating to installation.

### 3.1 Installation Location



### IMPORTANT

Install the instrument in a location where it is not exposed to direct sunlight.

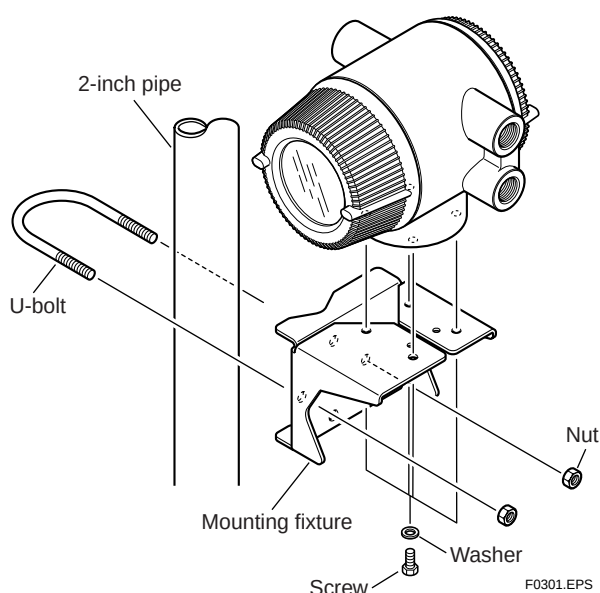
For ambient temperature refer to chapter 11 "OUTLINE".

The instrument may be used in an ambient humidity where the RH ranges from 0 to 100 %. However, avoid long-term continuous operation at relative humidity above 95 %.

### 3.2 Mounting

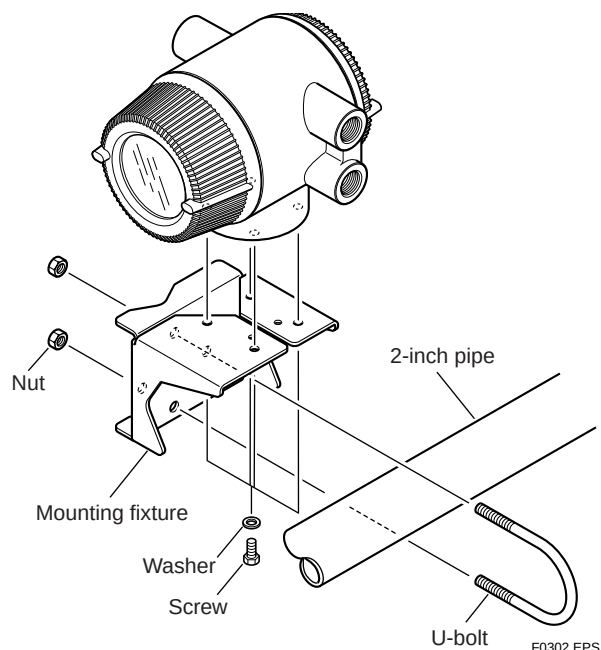
This instrument can be mounted on a 2-inch pipe in a horizontal or vertical position depending on the installation site.

#### • Vertical Mounting



1. Fix the instrument on the mounting fixture using four screws.
2. Fix the mounting fixture with the instrument installed on a 2-inch pipe using a U-bolt.

#### • Horizontal Mounting



1. Fix the instrument casing on the mounting fixture using four screws.
2. Fix the mounting fixture with the instrument installed on a 2-inch pipe using a U-bolt.

Figure 3.2.1 2-inch Pipe Mounting

### 3. INSTALLATION

## 4. WIRING

This chapter describes the wiring on the converter side only. For information relating to wiring on the flowtube side, refer to the user's manual of the AXF Remote Flowtube (IM 01R20D01-01E-E).



### WARNING

The wiring of the magnetic flowmeter must be performed by expert engineers or skilled personnel. No operator shall be permitted to perform procedures relating to wiring.



### CAUTION

Once all wiring is complete, check the connections before applying power to the instrument. Improper arrangements or wiring may cause a unit malfunction or damage.

## 4.1 Wiring Precautions

Be sure to observe the following precautions when wiring:



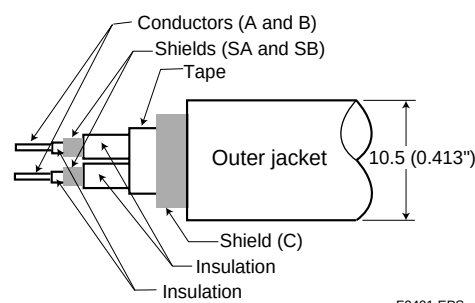
### CAUTION

- Do **not** splice the cable between the flowtube terminal and the converter if it is too short. Replace the short cable with a cable that is the appropriate length.
- In cases where the ambient temperature exceeds 50 °C (122 °F), use external heat-resistant wiring with a maximum allowable temperature of 70 °C (158 °F) or above.
- Do not connect cables outdoors in wet weather in order to prevent damage from condensation and to protect the insulation.
- All the cable ends must be provided with round crimp-on terminals and be securely wired.
- Ground the remote flowtube and the converter separately (with grounding resistance of 100 Ω or less)
- Cover each shield of the signal cable with vinyl tube or vinyl tape to avoid contact between two shields or between a shield and a case.

- The 24V dc power supply version is delivered with an electrical connection plug. Use this plug to cover the unused wiring port when wiring the instrument with only one, four-core cable.
- Be sure to turn power off before opening the cover.
- Before turning the power on, tighten the cover securely.
- Hazardous duty types must be wired in accordance with specific requirement (and, in certain countries, legal regulations) in order to preserve the effectiveness of their explosion protected features.
- The terminal box cover is locked by the special screw. In case of opening the terminal box cover, use the hexagonal wrench attached.
- Be sure to lock the cover by the special screw using the hexagonal wrench attached after installing the cover. For handling the locking screw, refer to fig. 4.4.12.
- The signal cables may be be routed in separate steel conduit tubes 16 (JIS C 8305) or flexible conduit tubes 15 (JIS C 8309).
- If possible route the power and output signal cables in separate steel conduit tubes, except when the power supply voltage is 24 V and four-core cables are used for wiring. Keep conduits or flexible tubes watertight using sealing tape.
- When waterproof glands or union equipped waterproof glands are used, avoid tightening the glands with an excessive torque.

## 4.2 Cables

### (1) Dedicated Signal Cable (AXFC)



F0401.EPS

Figure 4.2.1 Dedicated Signal Cable AXFC

#### 4. WIRING

The flow signal is transmitted via this dedicated cable. The cable is constructed with double shielding over the two conductors, and heat-resistant vinyl is used for the outer jacket material.

Finished diameter : 10.5 mm (0.413")  
Maximum length : 100 m (330 ft)  
Maximum temperature : 80 °C (176 °F)



#### IMPORTANT

If the supplied cable is longer than required, cut off any extra length rather than coiling it up. Terminate the conductors as shown in Figure 4.2.2. Avoid using junction terminal boards to extend the cable as this will interrupt the shielding and might cause problems.

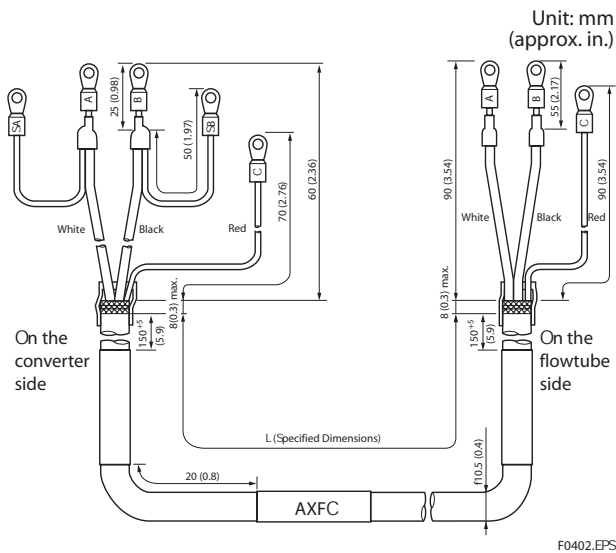


Figure 4.2.2 Treatment of Dedicated Signal Cables



#### CAUTION

- As crimp terminals A, B, SA, SB and C have their own electrical potentials, securely insulate them so as not to come in contact with one another.
- To prevent a shield from coming in contact with another shield or the case, cover each shield with a vinyl tube or wrap it in vinyl tape.



#### NOTE

Conductors A and B carry the signal from the electrodes, and C is at the potential of the liquid (signal common). Shields SA and SB are kept at the same potentials as the individual electrodes (these are actively driven shields.) This is done to reduce the effect of the distributed capacitance of the cable at long cable length. Note that, since the signals from the individual electrodes are impedance converted inside the converter, errors will result if they come in contact with any other component. Great care must be taken in the cable end treatment.

#### (2) Excitation Cable / Power Cable / Output Cable

Use polyvinyl chloride insulated and sheathed control cables (JIS C 3401) or polyvinyl chloride insulated and sheathed portable power cables (JIS C 3312) or the equivalent.

Outer Diameter: 6.5 to 12 mm in diameter

Nominal Cross Section (Single wire): 0.5 to 2.5 mm<sup>2</sup>

Nominal Cross Section (Stranded wire): 0.5 to 1.5 mm<sup>2</sup>

In case of power cable, Green/Yellow covered conductor shall be used only for connection to PROTECTIVE CONDUCTOR TERMINALS (⏏). Conform to IEC227, IEC245 or equivalent national authorization.

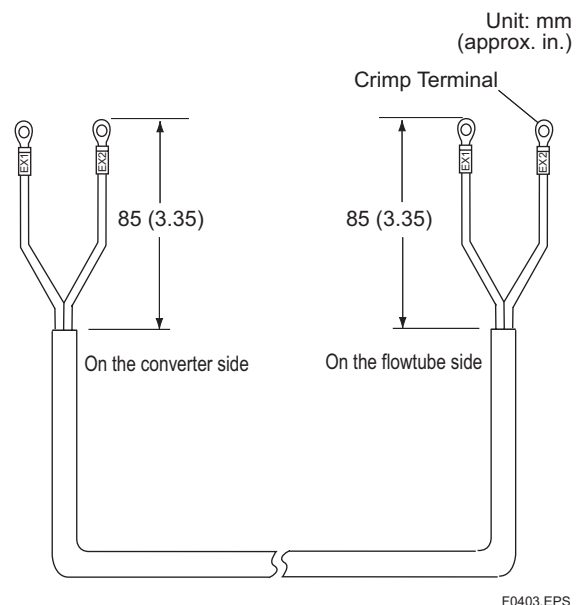


Figure 4.2.3 End Treatment of Excitation Cable

**NOTE**

- For excitation and power cables always use a crimp terminal with an insulation cover.
- Use crimp tools from the manufacturer of the crimp terminal you want to use to connect the crimp terminal and cable.
- Use crimp tools that are appropriate for the diameter of the cable to be connected.

## 4.3 Wiring Ports

This instrument is of watertight construction as described in JIS C0920-1982 (Tests to prove protection against ingress of water and degrees of protection against ingress of solid objects for electrical equipment.). It is shipped with a wiring bracket (waterproof gland or waterproof gland with union) or a plastic gland attached, only in cases where an optional specification is selected for the wiring port. In case of hazardous duty type instruments refer to chapter 12.

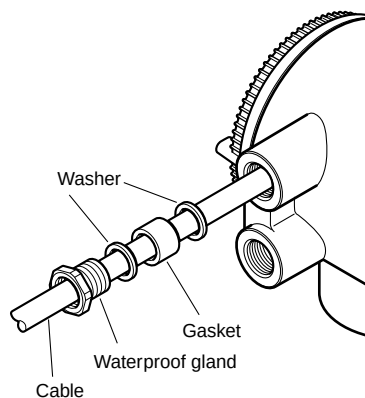
### (1) When there are no particular optional specifications

The wiring port is sealed with a cap (not waterproof) that must be removed before wiring. At this time, handle the wiring port in accordance with the JIS C0920-1982 mentioned above.

### (2) Wiring using waterproof glands

**IMPORTANT**

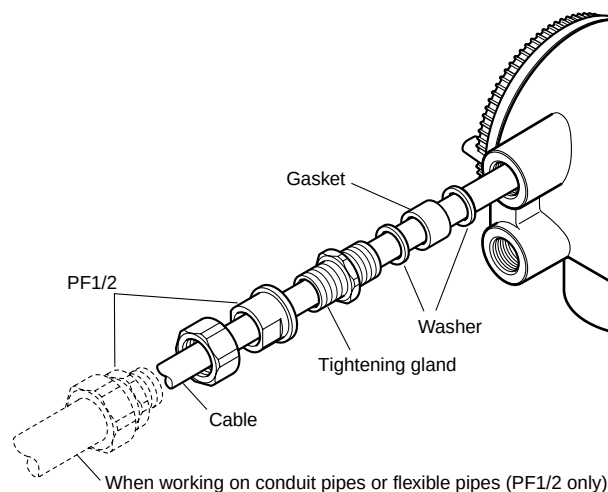
To prevent water or condensation from entering the converter housing, waterproof glands are recommended. Do not over-tighten the glands or damage to the cables may result. Tightness of the gland can be checked by confirming that the cable is held firmly in place.



F0404.EPS

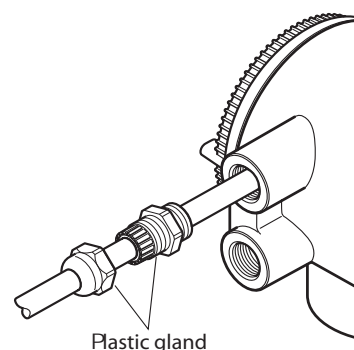
**Figure 4.3.1 Waterproof Gland**

For working on the electric wire tubes or the flexible tubes (PF1/2), remove the waterproof gland and attach them directly to the wiring port.



F0405.EPS

**Figure 4.3.2 Waterproof Gland with Union Joint**



F0406.EPS

**Figure 4.3.3 Plastic Gland**

## 4. WIRING

### (3) Conduit Wiring

When wiring the conduits, pass the conduit through the wiring connection port and utilize the waterproof gland to prevent water from flowing in. Place the conduit pipe on an angle as shown in Figure 4.3.4. Install a drain valve at the low end of the vertical pipe, and open the valve regularly.

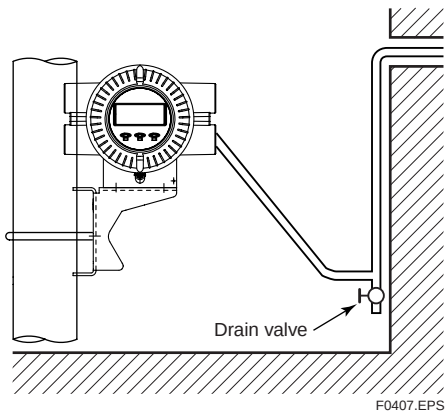


Figure 4.3.4 Conduit Wiring

## 4.4 Wiring Connections

### 4.4.1 Removing Cover

Loosen cover locking screw 2 clockwise using a hexagonal wrench (nominal size 3 mm) to unlock the cover. (Upon shipment from the manufacturing plant, the cover is unlocked.) Hold the flowmeter with your hand and remove the cover by turning it in the direction of the arrow as shown below.

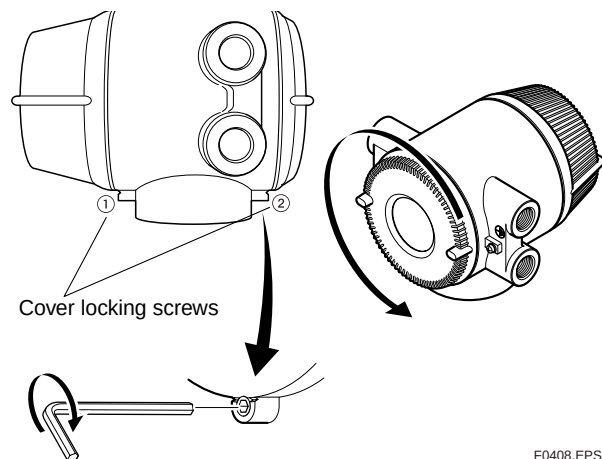


Figure 4.4.1 Removing the Terminal Box Cover

### 4.4.2 Terminal Configuration

When the cover is removed, the connection terminals will be visible. The terminal configuration labels are attached in the locations shown in Figure 4.4.2.

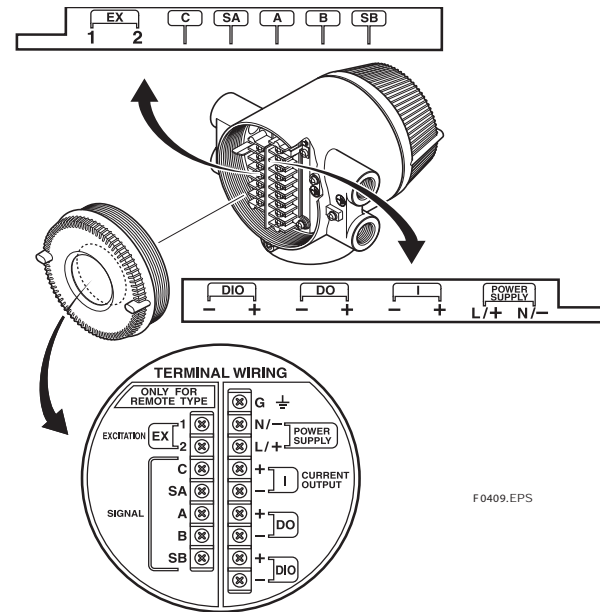


Figure 4.4.2 Terminal Layout Labels Position

The description of the terminal symbols is shown in Table 4.1.1.

For FOUNDATION Fieldbus protocol please refer to IM 01E20F02-01E.

Table 4.1.1 Terminal Symbols

| Terminal Symbols        | Description               | Terminal Symbols | Description                                       |
|-------------------------|---------------------------|------------------|---------------------------------------------------|
| EX1<br>EX2              | Excitation current output |                  | Functional grounding                              |
| C<br>SA<br>A<br>B<br>SB | Flow signal input         | N/-<br>L/+       | Power supply                                      |
|                         |                           | I+<br>I-         | Current output<br>4 to 20mA DC                    |
|                         |                           | DO+<br>DO-       | Pulse output/<br>Alarm output/<br>Status output   |
|                         |                           | DIO+<br>DIO-     | Alarm output/<br>Status output/<br>Status input   |
|                         |                           |                  | Protective grounding<br>(Outside of the terminal) |

T0401.EPS

### 4.4.3 Precautions for Wiring of Power Supply Cables

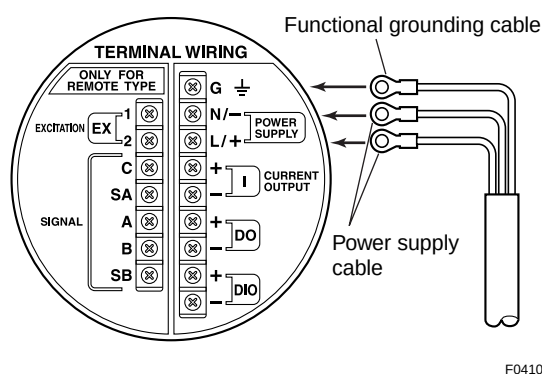
When connecting to the power supply, consider the points below. Failure to comply with these warnings may result in an electric shock or damage to the instrument.

**WARNING**

- Ensure that the power supply is OFF in order to prevent electric shocks.
- Ensure the protective grounding terminal is grounded with a grounding resistance of 100  $\Omega$  or less before turning the power on.
- Use insulating sleeve crimp terminals (for 4-mm screws) for the power supply wiring and protective grounding wiring.
- Install an external switch or circuit breaker as a means to turn the power off (capacitance; 15A, conforming to IEC947-1 and IEC947-3). Locate this switch either close to the instrument or in other places facilitating easy operation. Affix a "Power Off Equipment" label to this external switch or circuit breaker.

**Wiring Procedure**

1. Turn the instrument's power off.
2. Wire the power supply cable and the functional grounding cable to the power supply terminals.



F0410.EPS

Figure 4.4.3 Electric Cable Wiring

**4.4.4 DC Power Connection**

When using DC power as the power supply for the converter, give attention to the following points.

**(1) Connecting Power Supply****IMPORTANT**

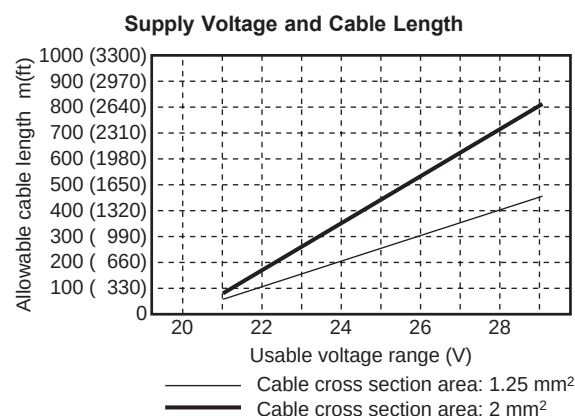
Do not connect power supply with reversed polarities.

L/+ terminal: connect +

N/- terminal: connect -

**(2) Required Power Supply Voltages****IMPORTANT**

When using a 24 V power supply, the specification for the supply voltage is 24 V (–15% to +20%), but the input voltage of the converter drops due to cable resistance therefore it must be used within the following ranges.

**(3) Setting Power Supply Frequency****IMPORTANT**

Set the local power frequency in order to eliminate the effect of induction noise from the power supply.

Refer to "Chapter 6: Parameter Description" in this manual.

Parameter No.: **J30** and **J31**

**4.4.5 Grounding****CAUTION**

Be sure to connect the protective grounding of the AXFA14 with a cable of 2 mm² or larger cross section in order to avoid electrical shock to the operators and maintenance engineers and to prevent the influence of external noise. Connect the grounding wire to the  $\oplus$  mark (resistance of the grounding wire 100  $\Omega$  or less). For hazardous duty type instruments follow the domestic electrical requirements as regulated in each country.

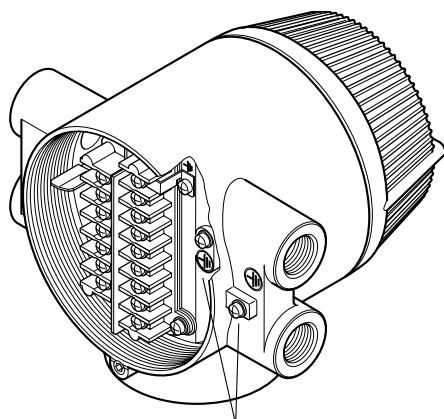
## 4. WIRING



### IMPORTANT

When a lightning protector (option code: /A) is selected, use a grounding with a resistance of 10  $\Omega$  or less.

- The protective grounding terminals (⏏) are located on the inside and outside of the terminal area. Either terminal may be used.
- Use 600 V vinyl insulation wires as the grounding wires.



Protective grounding terminals

F0412.EPS

Figure 4.4.4 Protective Grounding Terminal Location

### 4.4.6 Wiring the Remote Flowtube with AXFA14 Converter

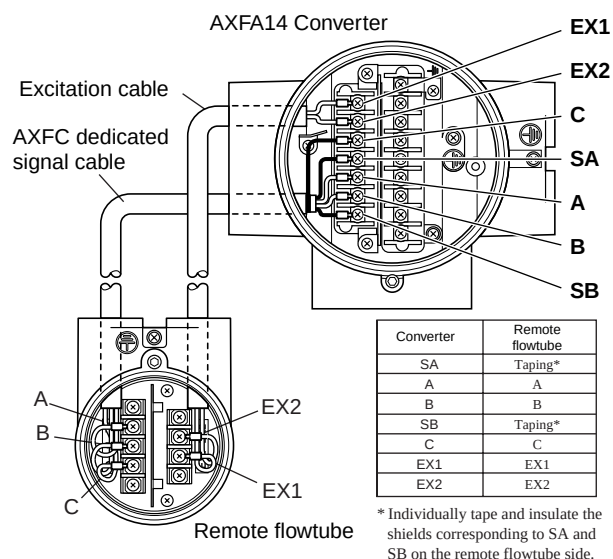


### WARNING

Before wiring, be sure that the power supply for AXFA14 converter has been turned off to prevent an electrical shock.

#### (1) Connection with the Remote Flowtube (General-Purpose Use, Submersible Style, Sanitary Style size 2.5 to 400 mm (0.1 to 16 in.))

Connect wiring as shown in the figure below.



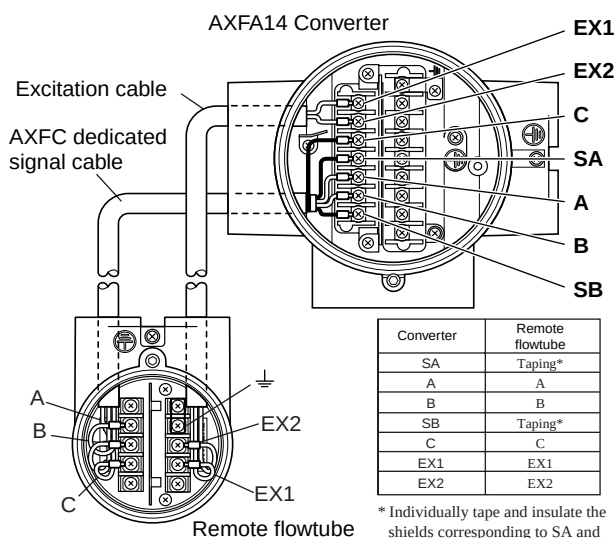
F0413.EPS

Figure 4.4.5 Wiring Diagram

#### (2) Connection with the Remote Flowtube (Explosion Proof Style size 2.5 to 400 mm (0.1 to 16 in.))

Connect wiring as shown in the figure below.

In case of explosion proof type (ATEX, FM, CSA, IECEx) the protective grounding (⏏) of remote flowtube must be connected to a suitable IS-grounding system. In that case  $\perp$  (functional grounding terminal) must not be connected.



F0414.EPS

Figure 4.4.6 Wiring Diagram

### 4.4.7 Connecting to External Instruments



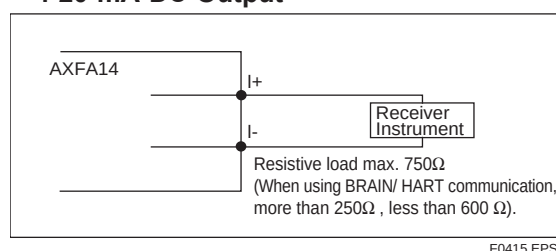
#### WARNING

Before wiring with external instruments, be sure to turn off the power supply for AXFA14 converter and any external instruments.

Connect the AXFA14 terminal to external instruments, giving attention to the following points.

For FOUNDATION Fieldbus protocol please refer to IM 01E20F02-01E.

#### 4-20 mA DC Output



F0415.EPS

Figure 4.4.7 4-20 mA DC Output Connection

#### Pulse Output



#### IMPORTANT

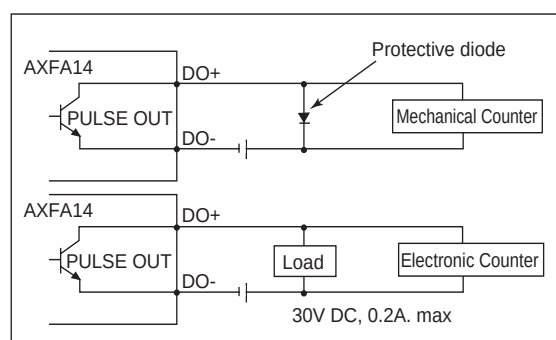
- As this is a transistor contact (insulated type), give attention to proper voltage and polarity when wiring.
- Do not apply a voltage larger than 30V DC or a current larger than 0.2A in order to prevent damage to the instrument.
- When input filter constant of the electronic counter is large in relation to the pulse width, the signal will decrease and the count will not be accurate.
- If the input impedance of the electronic counter is large, an induction noise from the power supply may result in inaccurate counts. Use a shielded cable or sufficiently reduce the input impedance of the electronic counter within the electromagnetic flowmeter pulse output specification range.
- The active pulse output optional code (/EM) cannot be used in conjunction with the standard pulse output.
- When the active pulse output (/EM) is selected, do not short-circuit the DO+ and DO- terminals to avoid damaging the instrument.

- When the active pulse output (optional code /EM) is selected, the range of pulse rate must be set to 2ppm maximum.
- To avoid communication (BRAIN/ HART) failure, it is recommended to use the shielded cable.



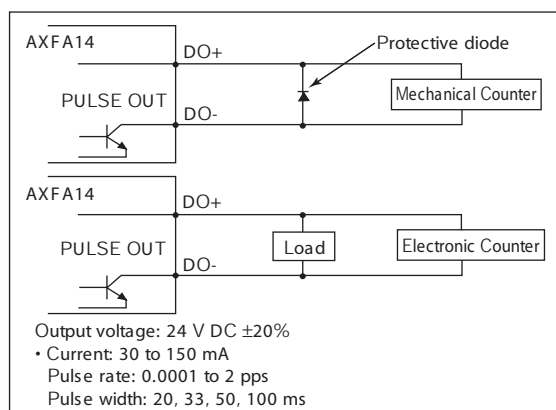
#### NOTE

For pulse output from the DO terminals, parameters must be set. Refer to "Chapter 6: Parameter Description" in this manual.



EN416 EDC

Figure 4.4.8 Pulse Output Connection



F0417.EPS

Figure 4.4.9 Active Pulse Output (/EM)

#### Status Input



#### IMPORTANT

Status inputs are designed for use with no-voltage (dry) contacts. Be careful not to connect the status to any signal source carrying voltage. Applying voltage may damage the input circuit.

## 4. WIRING

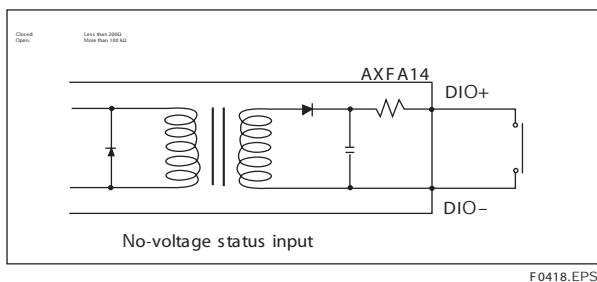


**Figure 4.4.10 Status Input Connection**



### NOTE

For status input to the DIO terminals, parameters must be set. Refer to “Chapter 6: Parameter Description” in this manual.

## • Status Output / Alarm Output



### IMPORTANT

Since this is an insulated transistor output, be careful of voltage and polarity when wiring. Do not apply a voltage larger than 30 V DC or a current larger than 0.2 A in order to prevent damage to the instrument.

This output cannot switch an AC load. To switch an AC load, an intermediate relay must be inserted as shown in Figure 4.4.11.

\*The alarm output operates from open (normal) to closed (alarm occurrence) in the default value (as setup upon plant shipment). Changes can be made via the parameter settings.

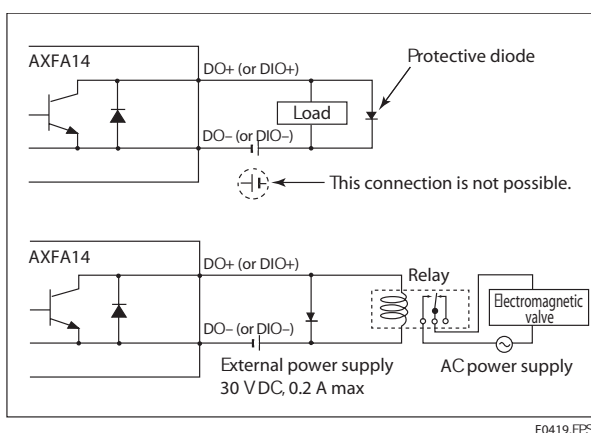


**Figure 4.4.11 Status Output/Alarm Output Connection**



### NOTE

For status and alarm outputs from the DO or DIO terminals, parameters must be set. Refer to “Chapter 6: Parameter Description” in this manual.

## 4.4.8 Installing the Cover

Install the cover to the flowmeter by turning it in the direction of the arrow as shown below. Tighten cover locking screw 2 counterclockwise using a hexagonal wrench (nominal size 3 mm) to lock the cover.

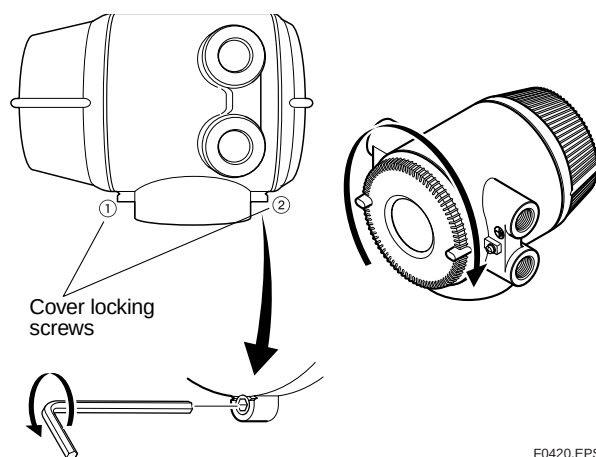


**Figure 4.4.12 Installing the Terminal Box Cover**

## 5. BASIC OPERATING PROCEDURES

The modification of data settings from the display unit can be carried out using the three setting switches (infrared switches) - namely, the SET, SHIFT, and ∇ switches. This chapter will provide a description of basic data configuration and the methods to be used with the three setting switches. The AXFA14 or the AXF integral flowmeter can also be operated using a handheld Brain Terminal (BT200) or a HART Communicator. (Please refer to Chapter 7 for operation via Brain Terminal and Chapter 8 for operation via HART Communicator.)



### IMPORTANT

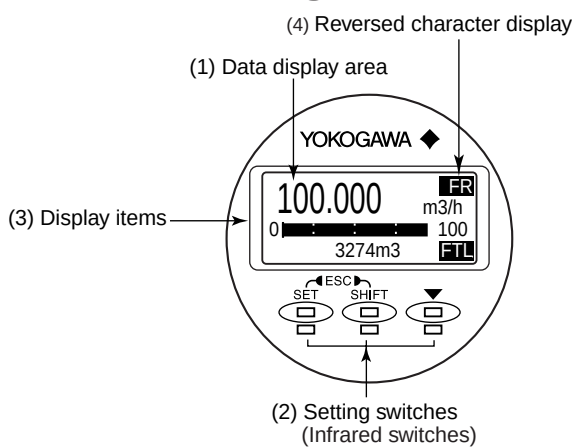
Operate the display unit under the condition where direct sunlight, etc.... do not shine to the setting switches directly when the parameter setting operation is carried out. Be sure to set parameters as "Protect" on the write protect function after the finish of parameter setting. Refer to the "Menu P: Parameter Protection Items" and section "10.2.2" in detail.



### NOTE

- (1) Always use the setting switches with the cover of the AXFA14 or the AXF integral flowmeter closed.
- (2) Use these switches when covered by the glass window.
- (3) If dirt, dust or other substances surfaces on the display panel glass, wipe them clean with a soft dry cloth.
- (4) The operation with dirty gloves may cause a switch response error.
- (5) If a user selected password is lost refer to page 6-11 of this manual.

## 5.1 Operating Panel Configuration and Functions



F0501.EPS

### (1) Data display area

1st line (Display Select1), 2nd line (Display Select2), and 3rd line (Display Select3) can be displayed using parameter settings. The content corresponding to selected item is shown with the reversed-character on the right side of the line.

### (2) Setting switch operations

SET: Move the layer down, select, and confirm

SHIFT + SET: Move the layer up (Press the SET switch while holding down the SHIFT switch)

∇: Move the cursor down (for selection-type parameters) or increase values (for numeric parameters)

SHIFT: Move the cursor to the right (for numeric parameters)

SHIFT + ∇: Move the cursor up (for selection-type parameters)

## 5. BASIC OPERATING PROCEDURES

### (3) Display items

| Displayed items and reversed-character indication |      | Content                                                                                                                                                             | Disp Select1                     | Disp Select2<br>Disp Select3 |
|---------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------|
| Instantaneous flow rate: %                        | FR   | Displays the instantaneous flow rate for the span as a percentage                                                                                                   | <input type="radio"/>            | <input type="radio"/>        |
| Actual instantaneous flow rate                    | FR   | Displays the actual reading for instantaneous flow rate.                                                                                                            | <input type="radio"/>            | <input type="radio"/>        |
| Instantaneous flow rate: mA                       | FR   | Displays the instantaneous flow rate for the span as a current output value.                                                                                        | <input type="radio"/>            | <input type="radio"/>        |
| Bar graph indicating instantaneous flow rate      | None | Displays the instantaneous flow rate for the span using a percentage bar graph.                                                                                     | <input checked="" type="radio"/> | <input type="radio"/>        |
| Totalized forward-direction flow rate             | FTL  | Displays the totalized value for flow rate in the forward direction.                                                                                                | <input type="radio"/>            | <input type="radio"/>        |
| Totalized reverse-direction flow rate             | RTL  | Displays the totalized value for flow rate in the reverse direction.                                                                                                | <input type="radio"/>            | <input type="radio"/>        |
| Totalized differential flow rate                  | DTL  | Displays the totalized value for flow rate between forward totalization and reverse totalization.                                                                   | <input type="radio"/>            | <input type="radio"/>        |
| Tag number                                        | TAG  | Displays the tag number (using up to 16 characters).                                                                                                                | <input checked="" type="radio"/> | <input type="radio"/>        |
| Diagnosis of electrode adhesion                   | ADH  | Displays the adhesion condition in the form of a bar graph. (See the description for parameters K10 to K15 from Chapter 6: Parameter Description for more details.) | <input checked="" type="radio"/> | <input type="radio"/>        |
| Communication                                     | COM  | Displays the communication type.                                                                                                                                    | <input checked="" type="radio"/> | <input type="radio"/>        |

T0501.EPS

(4)

## 5.2 Display Unit Setting Methods

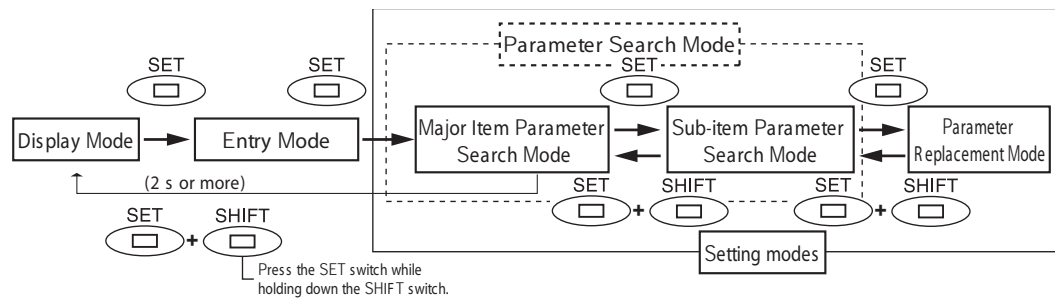


### NOTE

- Before changing any settings, be sure to check the corresponding setting details in Chapter 6: Parameter Description.
- If a user selected password is lost refer to page 6-11 of this manual

### 5.2.1 Display Mode → Setting Mode

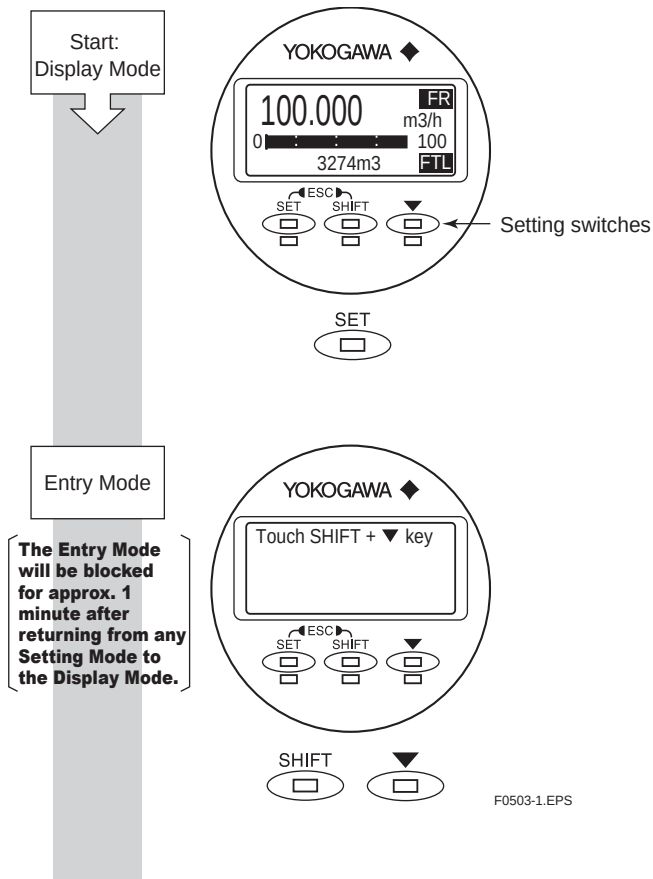
Display Mode will be adopted when the power is turned on, and the Setting Mode can be activated using the following procedure.



\* The term "mode" is used to refer to a situation where display and setting are possible.

F0502.EPS

### Sample Display: Procedure for moving from Display Mode to Setting Mode



1st line: Actual instantaneous flow rate [FR]

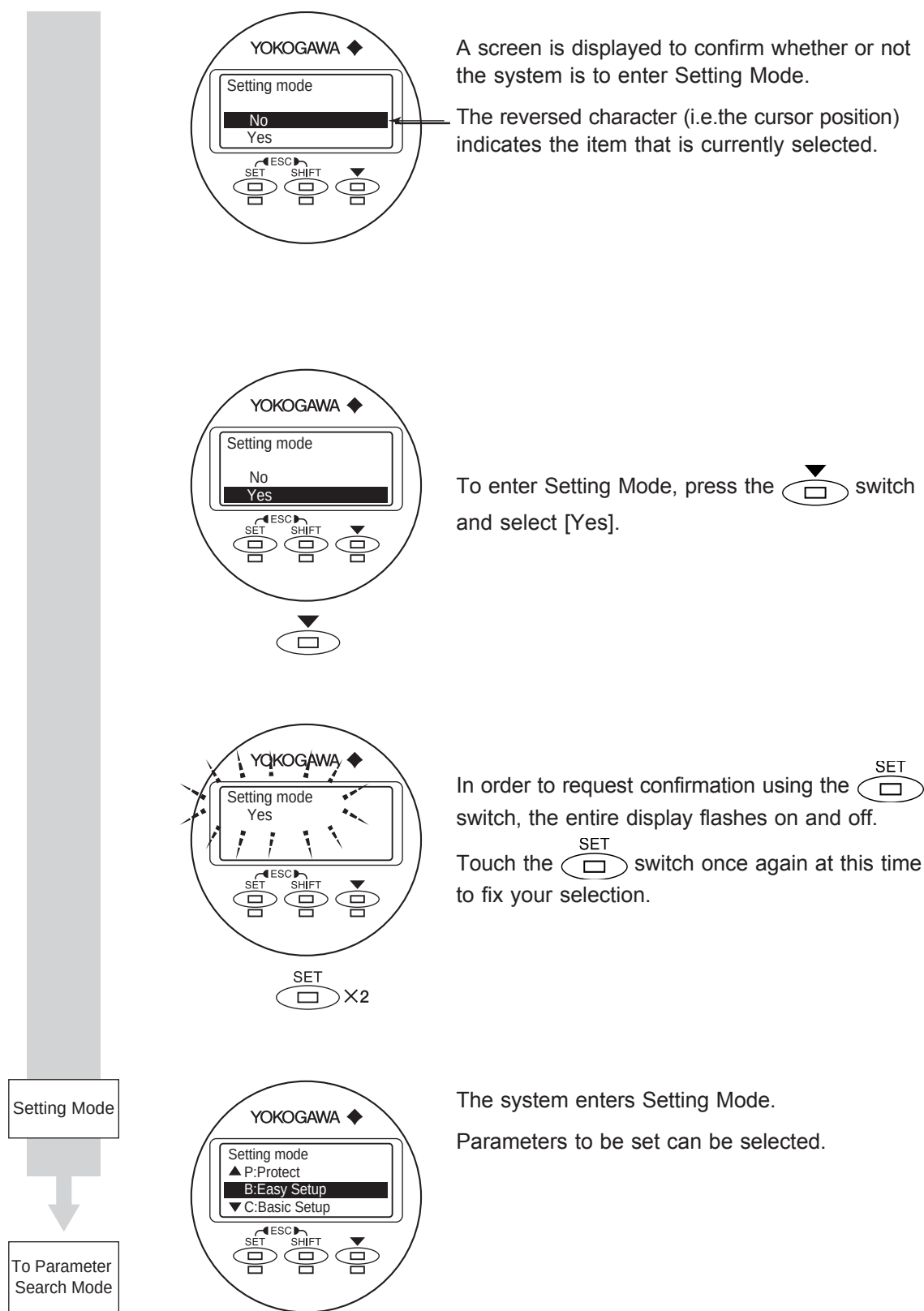
2nd line: Bar graph indicating instantaneous flow rate

3rd line: Totalized forward flow rate [FTL]

Hold the SET switch for 2 s.

Touch SHIFT and ▼ switches simultaneously.

## 5. BASIC OPERATING PROCEDURES



F0503-2.EPS

This completes the procedure for changing from the Display Mode to the Parameter Search Mode.

## 5.2.2 Setting Mode

When the Setting Mode has been activated using the procedure from Section 5.2.1, parameters can be selected for setting. If no operations are carried out for a period of 10 min in this mode, the system will automatically return to the Display Mode.

### Format for Parameter Data

Depending on the type of parameter, data is formatted in one of the following three ways.

| Format                  | Typical display                                                   | Content                                                                                                                                                                                              |
|-------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (i) Selection-type      | B21:Base Flow Unit<br>m3<br>▲m3<br>▼kl(Kiloliter)                 | The desired data item is selected from a predefined list.                                                                                                                                            |
| (ii) Numeric-type       | B23:Flow Span<br>100 l/min<br>000100 l/min<br>Rng:0.00001 → 32000 | Data is set using the values in each digit and using the decimal point.                                                                                                                              |
| (iii) Alphanumeric-type | C10:Tag No<br>FI-1101<br>FI-1201                                  | Data is composed using alphanumeric characters (in the case of tag numbers, special units, and the like). With this format, setting can be carried out using up to 16 of the characters shown below. |

Regarding the alphanumeric-type format (iii), the following alphanumerics are displayed in the following sequence:

#%&\*+-. / 0 1 2 3 4 5 6 7 8 9 : < > A B C D E F G H I J K L M N O P Q R S T U V W X Y Z a b c d e f g h i j k l m n o p q r s t u v w x y z [space]

T0502.EPS

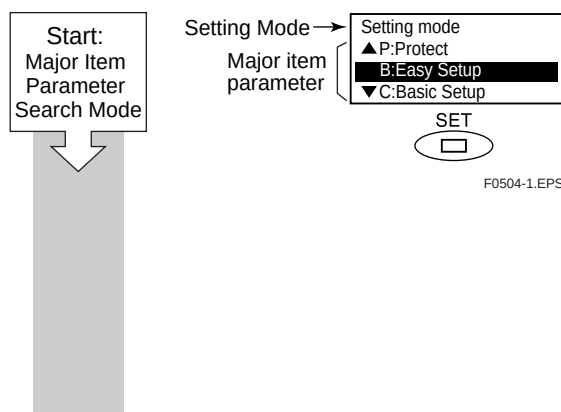
## 5.3 Parameter Setting Procedure

Once the system is in Setting Mode, the parameters for setting can be selected. Parameters that are frequently used have been grouped together in Easy Setup in Menu B. This section provides a description of the parameter setting procedure using **B: Easy Setup**.

For more details regarding parameter content, please refer to Section 6: Parameter Description.

### 5.3.1 Setting Example for Selection-Type Data: Flow rate units

This example describes the setting of the flow rate units for the selection-type parameter **B21: Base Flow Unit** from m<sup>3</sup> to l (Liter).



Major Item Parameter Search Mode has been accessed in this screen.

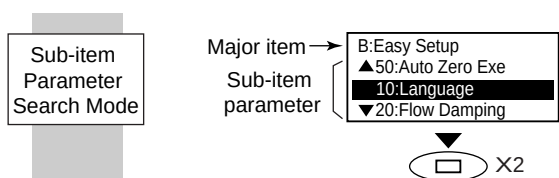
Touch the  switch to access **B: Easy Setup**.



#### NOTE

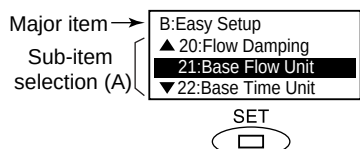
The ▲ and ▼ symbols to the left of the parameters indicate that additional setting items to those being currently displayed may also be selected. Use the  switch to cycle through these items.

## 5. BASIC OPERATING PROCEDURES

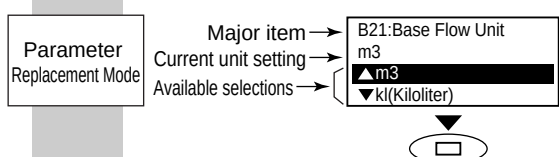


Sub-Item Parameter Search Mode has been accessed in this screen.

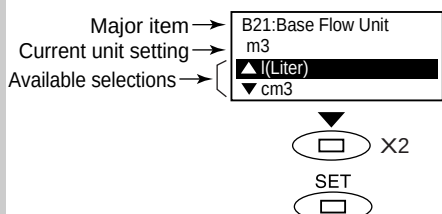
Touch the  switch to move the cursor to **B21: Base Flow Unit**.



The cursor has been moved to **B21: Base Flow Unit** in this screen. (Sub-Item Selection Screen (A))

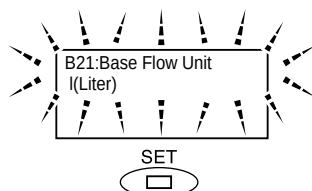


In this screen, Parameter Replacement Mode is activated by using the  switch.



Touch the  switch to move the cursor to the unit item for selection. In this example, the  switch is touched twice to select l (Liter)

When l (Liter) has been selected, touch the  switch.



In order to request confirmation using the  switch, the entire display flashes on and off.  
Touch the  switch once again at this time to fix your selection.

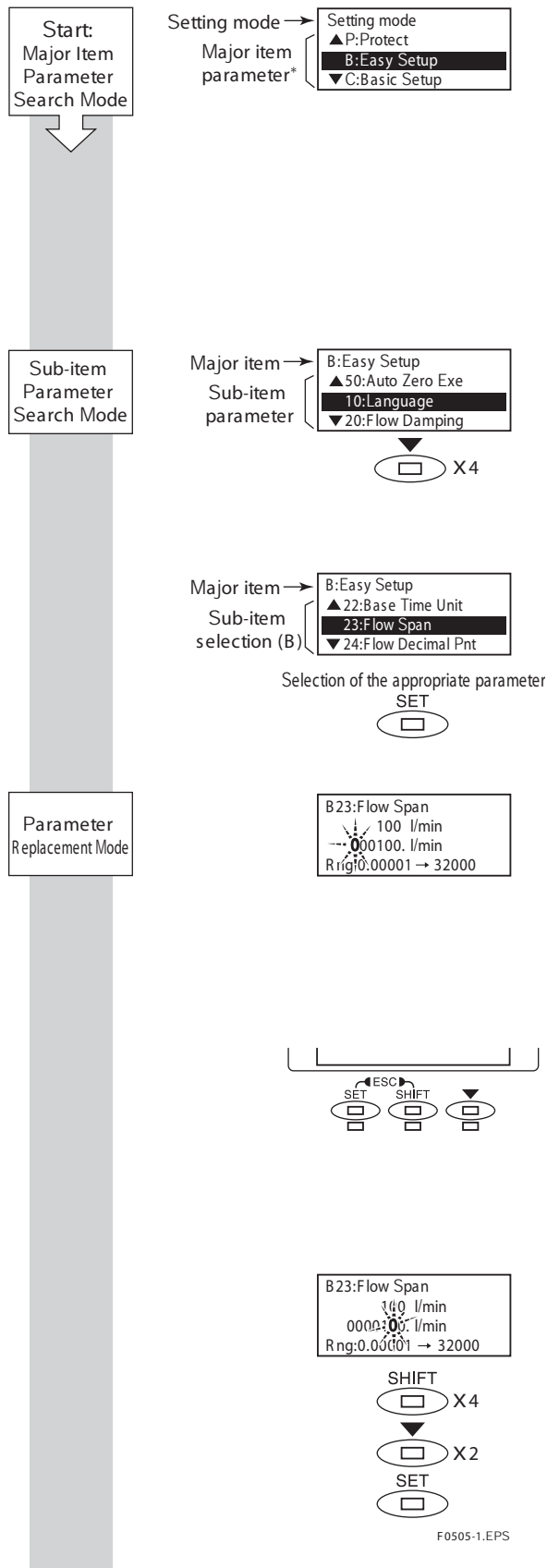


The system returns automatically to Sub-Item Selection Screen (A).

F0504-2.EPS

### 5.3.2 Setting Example for Numeric-Type Data: Flow-rate span

This example describes the setting of the flow rate span for the numeric-type parameter **B23: Flow Span** from 100 l/min to 120 l/min.



#### Setting Mode Condition

Touch the  switch to access **B: Easy Setup**.



#### NOTE

\*: The ▲ and ▼ symbols to the left of the parameters indicate that additional setting items to those being currently displayed may also be selected. Use the  switch to cycle through these items.

Sub-Item Parameter Search Mode has been accessed in this screen.

Touch the  switch to move the cursor to **B23: Flow Span**.

The cursor has been moved to **B23: Flow Span** in this screen. (Sub-Item Selection Screen (B))

Use the  switch to access Parameter Replacement Mode.

Once Parameter Replacement Mode has been selected, the digit that can be replaced will flash on and off. When in this condition, confirm the relevant setting range as displayed at the bottom of the screen and then set the parameter as required. In this example, the parameter will be set to 120 l/min.



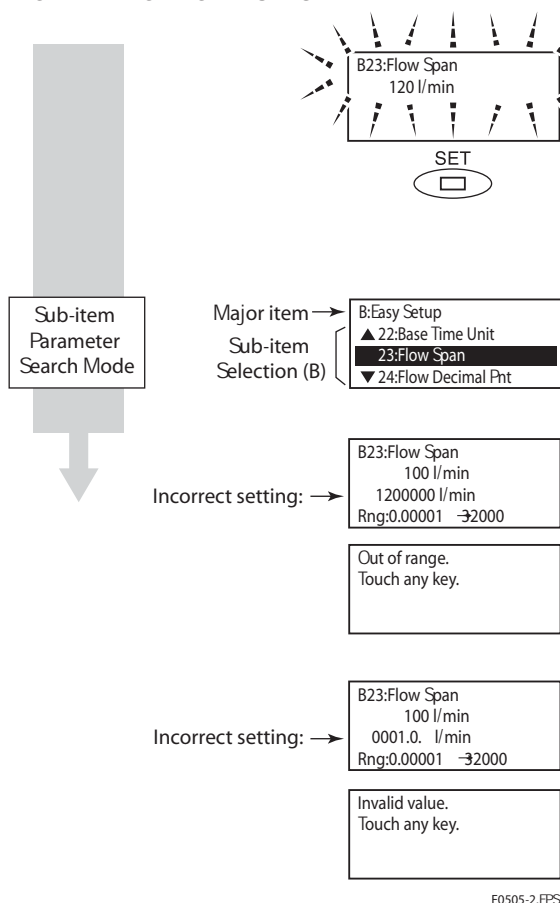
#### NOTE

When setting a new value, use the  switch to move from digit to digit, and use the  switch to cycle through values for each individual digit. In addition to digit, it is also possible to select a decimal point, and this allows the position of the decimal point to be changed.

Modify the value to 120 l/min as follows:

Use the  switch to move the cursor to the position for multiples of 10. Then, use the  switch to change the value at this position from 0 to 2. When the value of 120 has been setup, touch the  switch.

## 5. BASIC OPERATING PROCEDURES



When the  switch is touched, the entire display will flash on and off. Confirm that the setting has been correctly changed to 120, and then fix this value by touching the  switch once again.

The system returns automatically to Sub-Item Selection Screen (B).



### NOTE

If the input value is outside the valid selection range, the message “Out of range. Touch any key.” will be displayed. In such a case, touch any switch to return to Parameter Replacement Mode and redo the setting.

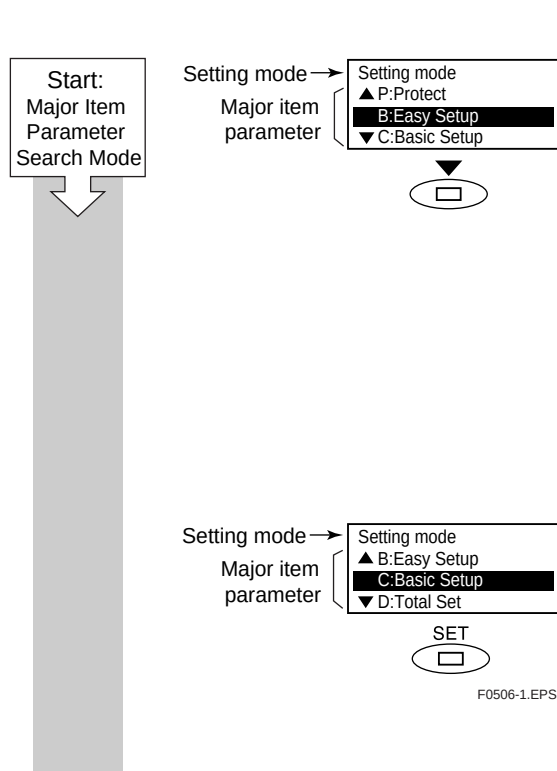


### NOTE

If more than one decimal point has been input, the message “Invalid value. Touch any key.” will be displayed. In such a case, touch any switch to return to Parameter Replacement Mode and redo the setting.

### 5.3.3 Setting Example for Alphanumeric-Type Data: Tag number

This example describes the setting of the tag number for the alphanumeric-type parameter **C10: Tag No.** from “FI-1101” to “FI-1201.”



### NOTE

If AXFA14 converter is configured for HART-communication (Type AXFA14□-E...) the Tag # in C10 should be max. 8 digits. This is to avoid communication errors, because HART hosz systems recognize only 8 digit Tag numbers.

### Setting Mode Condition

Touch the  switch to access **C: Basic Setup**.



### NOTE

The ▼ and ▲ symbols to the left of the parameters indicate that additional setting items to those being currently displayed may also be selected. Use the  switch to cycle through these items.

The cursor has been moved to **C: Basic Setup** in this screen.

Touch the  switch to enter **C: Basic Setup**.

Upon selection of C: Basic Setup, the cursor will be positioned at **C10: Tag No.** (Sub-Item Selection Screen (D))

Use the  switch to access Parameter Replacement Mode.

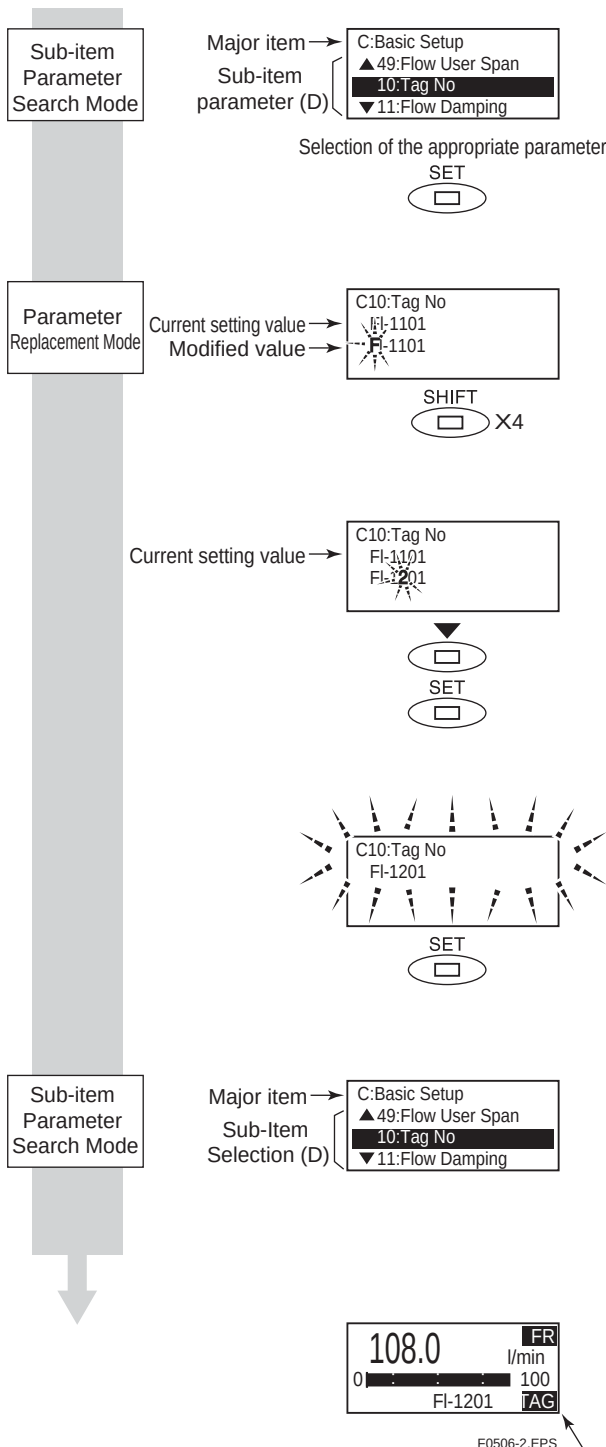
The cursor will flash on and off on the left digit of the tag number. As “FI-1201” is to be setup in this example, use the  switch to move the cursor to the position for multiples of 100.

At the position for multiples of 100, touch the  switch to change the 1 to 2. When the setting has been changed to “FI-1201”, touch the  switch.

When the  switch is touched, the entire display will flash on and off. Confirm that the setting has been correctly changed to “FI-1201”, and then fix this setting by touching the  switch once again.

The system returns automatically to Sub-Item Selection Screen (D).

After returning to Display Mode using the ( and ) as escape switches, it will be possible to confirm the modified content (if Display Select has been setup to display the tag number.)



Indicates selection of Tag No. display for B42: Display Select3

## 5. BASIC OPERATING PROCEDURES

## 6. PARAMETER DESCRIPTION

### 6.1 Parameters

With the exception of parameters that were specified by the customer upon ordering, all of the internal parameters will initially be set to default values. Actions such as the modification of display details can then be carried out whenever necessary.



#### IMPORTANT

Make sure to keep the instrument's power on at least for 30 s after you have set the parameters. If you turn the power off immediately after the parameters are set, the settings will be canceled.



#### NOTE

In order to ensure that correct flow-rate data can be acquired, it is crucial that the nominal size, flow-rate span, and meter factor of the combined remote flowtube are set. In cases where a remote flowtube is ordered at the same time as the AXFA14, or where the AXF integral flowmeter is ordered, the nominal size and meter factor will be set upon shipment from the manufacturing plant, and these will not require additional setting. If the AXFA14 is ordered separately, the default value will be set for the meter factor; accordingly, it will be necessary to change this setting to the meter factor indicated on your remote flowtube data plate. If a flow-rate span was specified upon ordering, this will be set before shipment. If this is not the case, however, it will be necessary for the appropriate value to be set by the user.

### 6.2 Parameter Lists

Parameter lists are comprised of the following items.

| Item | Name | R/W | Data range | Units | Position of decimal point | Default value | Description                                                                                                                                                                                                       |
|------|------|-----|------------|-------|---------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |      |     |            |       |                           |               | Describes the parameter content.                                                                                                                                                                                  |
|      |      |     |            |       |                           |               | The default value (as setup upon plant shipment). If marked "(*)", it indicates that the appropriate setting has been made in accordance with ordering information and data for a remote flowtube to be combined. |
|      |      |     |            |       |                           |               | The position of the decimal point within the data range and also the allowed relocation range in terms of places of decimals.                                                                                     |
|      |      |     |            |       |                           |               | The units corresponding to the data range.                                                                                                                                                                        |
|      |      |     |            |       |                           |               | This item defines the range of data to be set for numeric parameters and also defines selection of data for selection-type parameters.                                                                            |
|      |      |     |            |       |                           |               | R: Read only<br>W: Writable                                                                                                                                                                                       |
|      |      |     |            |       |                           |               | The name of the parameter. Entries in parentheses indicate the parameter name displayed on the handheld BRAIN Terminal (BT200).                                                                                   |
|      |      |     |            |       |                           |               | Parameter number.                                                                                                                                                                                                 |

T0601 EDC

## 6.3 Parameter List Overview

### (1) Item A (Menu A): Display items

Menu A contains the instantaneous flow rate, totalization values, and other items relevant to display.

| Item | Name                 | R/W | Data range            | Units             | Position of decimal point | Default value (*): Indicated item | Description                                           |
|------|----------------------|-----|-----------------------|-------------------|---------------------------|-----------------------------------|-------------------------------------------------------|
|      | Display unit (BRAIN) |     | Display unit /BRAIN   |                   |                           |                                   |                                                       |
| A00  | Display (DISPLAY)    | 1   |                       |                   |                           |                                   |                                                       |
| A10  | FR (FLOW RATE (%))   | R   | -110.0 to 110.0       | %                 | 1                         |                                   | For Display Mode only                                 |
| A20  | FR (FLOW RATE)       | R   | -999999 to 999999     | B21/B22 (C40/C41) | 0 to 3                    |                                   | For Display Mode only                                 |
| A21  | FR (FLW RATE (mA))   | R   | 2.400 to 21.600       | mA                | 3                         |                                   | For Display Mode only                                 |
| A30  | FTL (TOTAL)          | R   | 0 to 99999999         | B30 (D10)         | 0 to 7                    |                                   | For Display Mode only                                 |
| A31  | RTL (REV.TOTAL)      | R   | 0 to 99999999         | B30 (D10)         | 0 to 7                    |                                   | For Display Mode only                                 |
| A32  | DTL (DIF.TOTAL)      | R   | -99999999 to 99999999 | B30 (D10)         | 0 to 7                    |                                   | For Display Mode only                                 |
| A60  | — (SELF CHECK)       | R   | Good Error            |                   |                           |                                   | Display self-check result. See "6.5 Alarm Functions". |

T0602.EPS

### (2) Item B (Menu B): Easy Setup items

Those parameters with a high frequency of use have been grouped together in Menu B. All basic functions can be controlled using only the parameters from this block.

| Item | Name                        | R/W | Data range                                                                                                                                                                                                                                                                                                                                             | Units | Position of decimal point | Default value (*): Indicated item | Description                                                      |
|------|-----------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------|-----------------------------------|------------------------------------------------------------------|
|      | Display unit (BRAIN)        |     | Display unit /BRAIN                                                                                                                                                                                                                                                                                                                                    |       |                           |                                   |                                                                  |
| B00  | Easy Setup (EASY SETUP)     |     |                                                                                                                                                                                                                                                                                                                                                        |       |                           |                                   |                                                                  |
| B10  | Language (LANGUAGE)         | W   | English<br>Japanese<br>French<br>German<br>Italian<br>Spanish                                                                                                                                                                                                                                                                                          |       |                           | English                           | Selects the language uses for the display unit. Linked with H30. |
| B20  | Flow Damping (FLOW DAMPING) | W   | 0.1 to 200.0                                                                                                                                                                                                                                                                                                                                           | s     | 1                         | 3.0 s                             | Sets damping time. Linked with C11.                              |
| B21  | Base Flow Unit (FLOW UNIT)  | W   | Ml(Megaliter)<br>m <sup>3</sup><br>kl (Kiloliter)<br>l (Liter)<br>cm <sup>3</sup><br>m<br>t<br>kg<br>g<br>kcf<br>cf<br>mcf<br>Mgal (US)<br>kgal (US)<br>gal (US)<br>mgal (US)<br>kbbbl (US Oil)<br>bbl (US Oil)<br>mbbl (US Oil)<br>ubbl (US Oil)<br>kbbbl (US Beer)<br>bbl (US Beer)<br>mbbl (US Beer)<br>ubbl (US Beer)<br>ft<br>klb (US)<br>lb (US) |       |                           | m (*)                             | Selects flow units for the flow-rate span. Linked with C40.      |

T0603-1.EPS

## 6. PARAMETER DESCRIPTION

| Item | Name                            | R/W | Data range                                                                                                                                                      | Units             | Position of decimal point | Default value (*): Indicated item | Description                                                                                                                                                                                     |
|------|---------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | Display unit (BRAIN)            |     | Display unit /BRAIN                                                                                                                                             |                   |                           |                                   |                                                                                                                                                                                                 |
| B22  | Base Time Unit (TIME UNIT)      | W   | /d<br>/h<br>/min<br>/s                                                                                                                                          |                   |                           | /s (*)                            | Selects time units for the flow-rate span. Linked with C41.                                                                                                                                     |
| B23  | Flow Span (FLOW SPAN)           | W   | 0.0001 to 32000 (above 0)                                                                                                                                       | B21/B22 (C40/C41) | 0 to 4                    | 1 m/s (*)                         | Sets flow-rate span (with units from B21 and B22). Linked with C42.                                                                                                                             |
| B24  | Flow Decimal Pnt (FLOW DECIMAL) | W   | Auto<br>0<br>1<br>2<br>3                                                                                                                                        |                   |                           | Auto (*)                          | Selects decimal point position for the display unit's instantaneous flow rate. Linked with C43.                                                                                                 |
| B30  | Total Unit (TOTAL UNIT)         | W   | n Unit/P<br>u Unit/P<br>m Unit/P<br>Unit/P<br>k Unit/P<br>M Unit/P<br>Pulse/s                                                                                   |                   |                           | Pulse/s (*)                       | Selects an engineering multiplier (E-9, E-6, E-3, E3, E6 : nano, $\mu$ cr, milli, kilo Mega) for the base flow unit B21 / C40 per one pulse as used for totalization display.. Linked with D10. |
| B31  | Total Scale (TOTAL SCALE)       | W   | 0 to 32000                                                                                                                                                      | B30 (D10)         | 0 to 4                    | 0 (*)                             | Sets the mass or vol. quantity per one pulse for the totalization display. Linked with D11.                                                                                                     |
| B32  | Pulse Unit (PULSE UNIT)         | W   | n Unit/P<br>u Unit/P<br>m Unit/P<br>Unit/P<br>k Unit/P<br>M Unit/<br>Pulse/s                                                                                    |                   |                           | Pulse/s (*)                       | Selects an engineering multiplier (E-9, E-6, E-3, E3, E6 : nano, $\mu$ cr, milli, kilo Mega) for the base flow unit B21 / C40 per one pulse as used for the pulse output . Linked with E10.     |
| B33  | Pulse Scale (PULSE SCALE)       | W   | 0 to 32000                                                                                                                                                      | B32 (E10)         | 0 to 4                    | 0 (*)                             | Sets the mass or vol. quantity per one pulse for the pulse output . Linked with E11.                                                                                                            |
| B40  | Display Select1 (DISP SELECT1)  | W   | Flow Rate(%)<br>Flow Rate<br>Flow Rate(mA)<br>Forward Total<br>Reverse Total<br>Dif Total                                                                       |                   |                           | Flow rate                         | Selects the first line for Display Mode. Linked with H10.                                                                                                                                       |
| B41  | Display Select2 (DISP SELECT2)  | W   | Off<br>Flow Rate(%)<br>Flow Rate<br>Flow Rate(mA)<br>Flow Rate(Bar)<br>Forward Total<br>Reverse Total<br>Dif Total<br>Tag No<br>Adhesion Check<br>Communication |                   |                           | Off                               | Selects the second line for Display Mode. Linked with H11.                                                                                                                                      |
| B42  | Display Select3 (DISP SELECT3)  | W   | Same as B41 (Display Select2)                                                                                                                                   |                   |                           | Off                               | Selects the third line for Display Mode. Linked with H12.                                                                                                                                       |
| B50  | Auto Zero Exe (AUTOZERO EXE)    | W   | No Execution<br>Execution                                                                                                                                       |                   |                           | No Execution                      | Selects whether or not automatic zero adjustment is carried out. Linked with M10.                                                                                                               |
| B60  | — (SELF CHECK)                  | R   | Good<br>Error                                                                                                                                                   | —<br>—            |                           |                                   | Displays self-check result. See “6.5 Alarm Functions”.                                                                                                                                          |

T0603-2.EPS

## 6. PARAMETER DESCRIPTION

### (3) Item C (Menu C): Basic Setting items

Menu C principally contains the basic setting items for the flowtube.

| Item | Name                            | R/W | Data range                                                                                                                                                                                                                                                                                                                                                                           | Units              | Position of decimal point | Default value (*): Indicated item | Description                                                                                     |
|------|---------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------|
|      | Display unit (BRAIN)            |     | Display unit /BRAIN                                                                                                                                                                                                                                                                                                                                                                  |                    |                           |                                   |                                                                                                 |
| C00  | Basic Setup (BASIC SETUP)       |     |                                                                                                                                                                                                                                                                                                                                                                                      |                    |                           |                                   |                                                                                                 |
| C10  | Tag No (TAG NO)                 | W   | ASCII 16 characters                                                                                                                                                                                                                                                                                                                                                                  |                    |                           |                                   | Sets tag no. up to 16 characters. Max. 8 digits for HART type.                                  |
| C11  | Flow Damping (FLOW DAMPING)     | W   | 0.1 to 200.0                                                                                                                                                                                                                                                                                                                                                                         | s                  | 1                         | 3.0 s                             | Sets damping time. Linked with B20.                                                             |
| C20  | Measure Mode (MEASURE MODE)     | W   | Standard DF<br>Enhanced DF                                                                                                                                                                                                                                                                                                                                                           |                    |                           | Standard DF                       | Sets measurement mode for dual frequency excitation                                             |
| C21  | Low MF (LOW MF)                 | W   | 0.01 to 3.0000                                                                                                                                                                                                                                                                                                                                                                       |                    | 4                         | 1.0000 (*)                        | Sets low-frequency meter factor for standard dual frequency excitation                          |
| C22  | High MF (HIGH MF)               | W   | 0.01 to 3.0000                                                                                                                                                                                                                                                                                                                                                                       |                    | 4                         | 1.0000 (*)                        | Sets high-frequency meter factor for standard dual frequency excitation                         |
| C23  | Low MF(EDF) (LOW MF(EDF))       | W   | 0.00001 to 3.0000                                                                                                                                                                                                                                                                                                                                                                    |                    | 4                         | 0.0000 (*)                        | Sets low-frequency meter factor for enhanced dual frequency excitation                          |
| C24  | High MF(EDF) (HIGH MF(EDF))     | W   | 0.00001 to 3.0000                                                                                                                                                                                                                                                                                                                                                                    |                    | 4                         | 0.0000 (*)                        | Sets high-frequency meter factor for enhanced dual frequency excitation                         |
| C31  | Nominal Size Unit (SIZE UNIT)   | W   | mm<br>inch                                                                                                                                                                                                                                                                                                                                                                           |                    |                           | mm<br>inch                        | Selects the nominal size units for the flowtube.                                                |
| C32  | Nominal Size (NOMINAL SIZE)     | W   | 0.99 to 3000.1<br>0.01 to 120.1                                                                                                                                                                                                                                                                                                                                                      | mm<br>inch         | 0 to 2                    | 100 (*)                           | Sets flowtube nominal size in selected unit at C31.                                             |
| C40  | Base Flow Unit (FLOW UNIT)      | W   | M l (Megaliter)<br>m <sup>3</sup><br>kl (Kiloliter)<br>l (Liter)<br>cm <sup>3</sup><br>m <sup>3</sup><br>t<br>kg<br>g<br>kcf<br>cf<br>mcf<br>Mgal (US)<br>kgal (US)<br>gal (US)<br>mgal (US)<br>kbbbl (US Oil)<br>bbbl (US Oil)<br>mbbl (US Oil)<br>ubbl (US Oil)<br>kbbbl (US Beer)<br>bbbl (US Beer)<br>mbbl (US Beer)<br>ubbl (US Beer)<br>ft <sup>3</sup><br>klb (US)<br>lb (US) |                    |                           | m (*)                             | Selects flow units for the flow-rate span. Linked with B21.                                     |
| C41  | Base Time Unit (TIME UNIT)      | W   | /d<br>/h<br>/min<br>/s                                                                                                                                                                                                                                                                                                                                                               |                    |                           | /s (*)                            | Selects time units for the flow rate span. Linked with B22.                                     |
| C42  | Flow Span (FLOW SPAN)           | W   | 0.0001 to 32000                                                                                                                                                                                                                                                                                                                                                                      | C40/C41 (B21 /B22) | 0 to 4                    | 1 m/s (*)                         | Sets flow-rate span (with units from B21/C40 and B22)/C41. Linked with B23.                     |
| C43  | Flow Decimal Pnt (FLOW DECIMAL) | W   | Auto<br>0<br>1<br>2                                                                                                                                                                                                                                                                                                                                                                  |                    |                           | Auto (*)                          | Selects decimal point position for the display unit's instantaneous flow rate. Linked with B24. |

T0604-1.EPS

## 6. PARAMETER DESCRIPTION

| Item | Name                             | R/W | Data range                           | Units | Position of decimal point | Default value (*): Indicated item | Description                                                         |
|------|----------------------------------|-----|--------------------------------------|-------|---------------------------|-----------------------------------|---------------------------------------------------------------------|
|      | Display unit (BRAIN)             |     | Display unit /BRAIN                  |       |                           |                                   |                                                                     |
| C44  | Velocity Check (VELOCITY CHK)    | R   | 0.000 to 99.999                      | m/s   | 3                         |                                   | Display of the span setting using flow velocity (m/s).              |
| C45  | Density Unit (DENSITY UNIT)      | W   | kg/m <sup>3</sup><br>lb/gal<br>lb/cf |       |                           | kg/m <sup>3</sup>                 | Sets units for density when mass flow rate is selected.             |
| C46  | Mass Flow Density (MASS DENSITY) | W   | 0 to 32000                           | C45   | 0 to 4                    | 0                                 | Sets density when mass flow rate is selected (with units from C45). |
| C47  | User Span Select (USER SPN SEL)  | W   | No<br>Yes                            |       |                           | No                                | Selects whether or not special units are used as flow-rate units.   |
| C48  | Flow User Unit (FL USER UNIT)    | W   | 8 alphanumeric characters            |       |                           |                                   | Sets the special flow-rate units.                                   |
| C49  | Flow User Span (FL USER SPAN)    | W   | 0.001 to 32000                       | C48   | 0 to 4                    | 100                               | Sets span when using special flow-rate units.                       |
| C60  | — (SELF CHECK)                   | R   | Good<br>Error                        |       |                           |                                   | Displays self-check result. See "6.5 Alarm Functions".              |

T0604-2.EPS

### (4) Item D (Menu D): Total Setting items

Menu D contains setting items such as the totalization scale and the forward/reverse totalized values.

| Item | Name                           | R/W | Data range                                                                    | Units | Position of decimal point | Default value (*): Indicated item | Description                                                                                                                                                                                 |
|------|--------------------------------|-----|-------------------------------------------------------------------------------|-------|---------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | Display unit (BRAIN)           |     | Display unit /BRAIN                                                           |       |                           |                                   |                                                                                                                                                                                             |
| D00  | Total Set (TOTAL SET)          |     |                                                                               |       |                           |                                   |                                                                                                                                                                                             |
| D10  | Total Unit (TOTALUNIT)         | W   | n Unit/P<br>u Unit/P<br>m Unit/P<br>Unit/P<br>k Unit/P<br>M Unit/P<br>Pulse/s |       |                           | Pulse/s (*)                       | Selects an engineering multiplier (E-9, E-6, E-3, E3, E6 : nano, micro, milli, kilo Mega) for the base flow unit B21 / C40 per one pulse as used for totalization display. Linked with B30. |
| D11  | Total Scale (TOTAL SCALE)      | W   | 0 to 32000                                                                    | D10   | 0 to 4 (B30)              | 0 (*)                             | Sets the mass or vol. quantity per one pulse for the totalization display. Linked with B31.                                                                                                 |
| D12  | Total Decimal Pnt (TL DECIMAL) | W   | 0<br>1<br>2<br>3<br>4<br>5<br>6<br>7                                          |       |                           | 0                                 | Selects position of decimal point for totalization display                                                                                                                                  |
| D13  | Total Low Cut (TOTALLOWCUT)    | W   | 0 to 100                                                                      | %     | 0                         | 3 %                               | Sets the range in vicinity of 0% within which the totalization display will be halted.                                                                                                      |
| D20  | Total Execution (TOTAL EXEC)   | W   | Start<br>Stop<br>Preset Total<br>Preset Rev Total                             |       |                           | Start                             | Executes the start and stop of totalization, and the preset of totalized values.                                                                                                            |
| D21  | Ttl Set Val Lower (TL SETVAL)  | W   | 0 to 999999                                                                   |       | 0                         | 0                                 | Sets the totalized preset value (i.e., lower 6 digits of the 8-digit totalized value).                                                                                                      |
| D22  | Ttl Set Val Upper (TL SETVALU) | W   | 0 to 99                                                                       |       | 0                         | 0                                 | Sets the totalized preset value (i.e., upper 2 digits of the 8-digit totalized value).                                                                                                      |
| D23  | Ttl Switch Lower (TL SWITCHL)  | W   | 0 to 999999                                                                   |       | 0                         | 0                                 | Sets the totalized switch value (i.e., lower 6 digits of the 8-digit totalized value).                                                                                                      |
| D24  | Ttl Switch Upper (TL SWITCHUP) | W   | 0 to 99                                                                       |       | 0                         | 0                                 | Sets the totalized switch value (i.e., upper 2 digits of the 8-digit totalized value).                                                                                                      |
| D30  | Ttl User Select (TL USER SEL)  | W   | No<br>Yes                                                                     |       |                           | No                                | Selects whether or not special units are used as totalized units.                                                                                                                           |
| D31  | Ttl User Unit (TL USER UNIT)   | W   | 8 alphanumeric characters                                                     |       |                           |                                   | Sets the special totalized units.                                                                                                                                                           |
| D60  | — (SELF CHECK)                 | R   | Good<br>Error                                                                 |       |                           |                                   | Display self-check result. See "6.5 Alarm Functions".                                                                                                                                       |

T0605.EP

## 6. PARAMETER DESCRIPTION

### (5) Item E (Menu E): Pulse Setting items

Menu E contains items relevant to pulse output. This is used to set parameters such as the pulse scale and width.

| Item | Name                         | R/W | Data range                                                                          | Units     | Position of decimal point | Default value (*): Indicated item | Description                                                                                                                                                                           |
|------|------------------------------|-----|-------------------------------------------------------------------------------------|-----------|---------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | Display unit (BRAIN)         |     | Display unit /BRAIN                                                                 |           |                           |                                   |                                                                                                                                                                                       |
| E00  | Pulse Set (PULSE SET)        |     |                                                                                     |           |                           |                                   |                                                                                                                                                                                       |
| E10  | Pulse Unit (PULSE UNIT)      | W   | n Unit/P<br>u Unit/P<br>m Unit/P<br>Unit/P<br>k Unit/P<br>M Unit/P<br>Pulse/s       |           |                           | Pulse/s (*)                       | Selects an engineering multiplier (E-9, E-6, E-3, E3, E6: nano, µcro, milli, kilo, Mega) for the base flow unit B21 / C40 per one pulse as used for pulse output.<br>Linked with B32. |
| E11  | Pulse Scale (PULSE SCALE)    | W   | 0 to 32000                                                                          | E10 (B32) | 0 to 4                    | 0 (*)                             | Sets the mass or volume quantity per one pulse as used for pulse output.<br>Linked with B33.                                                                                          |
| E12  | Pulse Width (PULSE WIDTH)    | W   | 50% Duty<br>0.05 ms<br>0.1ms<br>0.5 ms<br>1 ms<br>20 ms<br>33 ms<br>50 ms<br>100 ms |           |                           | 50% Duty                          | Selects the pulse width for the pulse output.                                                                                                                                         |
| E13  | Pulse Low Cut (PULSE LOWCUT) | W   | 0 to 100                                                                            | %         | 0                         | 3 %                               | Sets the range in vicinity of 0% within which pulse output will be halted.                                                                                                            |
| E60  | — (SELF CHECK)               | R   | Good<br>Error                                                                       |           |                           |                                   | Displays self-check result.<br>See “6.5 Alarm Function”.                                                                                                                              |

T0606.EPS

### (6) Item F (Menu F): Status Functions Setting items

Menu F contains items relevant to multiplex range output and other status Input/Output.

| Item | Name                          | R/W | Data range                                                                                                                                                                                                                                                                                                                        | Units | Position of decimal point | Default value (*): Indicated item | Description                                      |
|------|-------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------|-----------------------------------|--------------------------------------------------|
|      | Display unit (BRAIN)          |     | Display unit /BRAIN                                                                                                                                                                                                                                                                                                               |       |                           |                                   |                                                  |
| F00  | Status Function (STATUS FUNC) |     |                                                                                                                                                                                                                                                                                                                                   |       |                           |                                   |                                                  |
| F20  | DO Function (DO FUNCTION)     | W   | No Function<br>Pulse Output<br>Alarm Output<br>Warning Output<br>Total Switch (O)<br>H/L Alarm (O)<br>HH/L L Alarm (O)<br>Fwd/Rev Rngs (O)<br>Auto 2 Rngs (O)<br>Auto 3 Rngs (O)<br>Auto 4 Rngs (O)<br>Ext 2 Answer (O)                                                                                                           |       |                           | No function                       | Selects function allocation for the DO terminal  |
| F21  | DIO Function (DIO FUNCTION)   | W   | No Function<br>Alarm Output<br>Warning Output<br>Total Switch (O)<br>H/L Alarm (O)<br>HH/L L Alarm (O)<br>Fwd/Rev Rngs (O)<br>Auto 2 Rngs (O)<br>Auto 3 Rngs (O)<br>Auto 4 Rngs (O)<br>Ext 2 Answer (O)<br>0% Signal Lock (I)<br>Ext Auto Zero (I)<br>Ext Ttl Set (I)<br>Ext R Ttl Set (I)<br>Ext 2 Ttl Set (I)<br>Ext 2 Rngs (I) |       |                           | No function                       | Selects function allocation for the DIO terminal |

T0607-1.EPS

## 6. PARAMETER DESCRIPTION

| Item | Name                            | R/W | Data range                        | Units    | Position of decimal point | Default value (*): Indicated item | Description                                                                  |
|------|---------------------------------|-----|-----------------------------------|----------|---------------------------|-----------------------------------|------------------------------------------------------------------------------|
|      | Display unit (BRAIN)            |     | Display unit /BRAIN               |          |                           |                                   |                                                                              |
| F22  | DO Active Mode (DO ACT MODE)    | W   | Closed(On) Act<br>Open(Off) Act   |          |                           | Closed(On) Act                    | Selects whether DO terminal will be set to "On Active" or "Off Active".      |
| F23  | DIO Active Mode (DIO ACT MODE)  | W   | Closed/Short Act<br>Open/Open Act |          |                           | Closed/Short Act                  | Selects whether DIO terminal will be set to "Short Active" or "Open Active". |
| F30  | Forward Span2 (FWD SPAN2)       | W   | 0.001 to 32000                    | C40 /C41 | 0 to 4                    | 1                                 | Sets flow rate span for forward No. 2 range                                  |
| F31  | Forward Span3 (FWD SPAN3)       | W   | 0.001 to 32000                    | C40 /C41 | 0 to 4                    | 1                                 | Sets flow rate span for forward No. 3 range                                  |
| F32  | Forward Span4 (FWD SPAN4)       | W   | 0.001 to 32000                    | C40 /C41 | 0 to 4                    | 1                                 | Sets flow rate span for forward No. 4 range                                  |
| F33  | Reverse Span1 (REV SPAN1)       | W   | 0.001 to 32000                    | C40 /C41 | 0 to 4                    | 1                                 | Sets flow rate span for reverse No. 1 range                                  |
| F34  | Reverse Span2 (REV SPAN2)       | W   | 0.001 to 32000                    | C40 /C41 | 0 to 4                    | 1                                 | Sets flow rate span for reverse No. 2 range                                  |
| F40  | Auto Range Hys (AUTO RNG HYS)   | W   | 0 to 15                           | %        | 0                         | 10 %                              | Sets hysteresis width for automatic range switching                          |
| F41  | Bi Direction Hys (BI DIREC HYS) | W   | 0 to 8                            | %        | 0                         | 2 %                               | Sets hysteresis width for forward/reverse switching                          |
| F60  | — (SELF CHECK)                  | R   | Good<br>Error                     |          |                           |                                   | Displays self-check result. See "6.5 Alarm Function".                        |

T0607-2.EPS

## (7) Item G (Menu G): Alarm Setting items

Menu G contains setting items relevant to alarm output, burnout, alarm record, etc.

| Item | Name                            | R/W | Data range                                       | Units | Position of decimal point | Default value (*): Indicated item | Description                                                                            |
|------|---------------------------------|-----|--------------------------------------------------|-------|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------|
|      | Display unit (BRAIN)            |     | Display unit /BRAIN                              |       |                           |                                   |                                                                                        |
| G00  | Alarm (ALARM)                   |     |                                                  |       |                           |                                   |                                                                                        |
| G10  | Low Alarm (LOW ALARM)           | W   | -110 to 110                                      | %     | 0                         | -110                              | Sets level setting value for low flow rate limit (L)                                   |
| G11  | High Alarm (HIGH ALARM)         | W   | -110 to 110                                      | %     | 0                         | 110                               | Sets level setting value for high flow rate limit (H)                                  |
| G12  | Low Low Alarm (LO LO ALARM)     | W   | -110 to 110                                      | %     | 0                         | -110                              | Sets level setting value for low-low flow rate limit (LL)                              |
| G13  | High High Alarm (HI HI ALARM)   | W   | -110 to 110                                      | %     | 0                         | 110                               | Sets level setting value for high-high flow rate limit (HH)                            |
| G14  | H/L Alarm Hys (H/L ALM HYS)     | W   | 0 to 10                                          | %     | 0                         | 5 %                               | Sets hysteresis width for high-low flow-rate limit alarm                               |
| G21  | 4-20mA Alarm Out (4-20 ALM OUT) | W   | 2.4mA or Less<br>4.0mA<br>Hold<br>21.6mA or More |       |                           | 21.6 mA or More                   | Selects the current output during alarm occurrence.                                    |
| G22  | 4-20mA Burn Out (4-20 BURNOUT)  | R   | High<br>Low                                      |       |                           | —                                 | Displays the 4-20mA output during a CPU failure.                                       |
| G30  | Alm-Setting (ALM-SETTING)       | W   | No<br>Yes                                        |       |                           | Yes                               | Selects whether a setting error is to be specified as an alarm.                        |
| G31  | Alm-Sig Over (ALM-SIG OVER)     | W   | No<br>Yes                                        |       |                           | Yes                               | Selects whether a signal overflow is to be specified as an alarm.                      |
| G32  | Alm-Emp Pipe (ALM-EMP PIPE)     | W   | No<br>Yes                                        |       |                           | Yes                               | Selects whether an empty pipe is to be specified as an alarm.                          |
| G33  | Alm-HH/LL (ALM-HH/LL)           | W   | No<br>Yes                                        |       |                           | No                                | Selects whether a flow rate high-high or low-low alarm is to be specified as an alarm. |
| G34  | Alm-Adhesion (ALM-ADHESION)     | W   | No<br>Yes                                        |       |                           | No                                | Selects whether an electrode adhesion is to be specified as an alarm.                  |

T0608-1.EPS

## 6. PARAMETER DESCRIPTION

| Item | Name                          | R/W | Data range                                                                                                                                                                                                                     | Units | Position of decimal point | Default value (*): Indicated item | Description                                                                    |
|------|-------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------|-----------------------------------|--------------------------------------------------------------------------------|
|      | Display unit (BRAIN)          |     | Display unit /BRAIN                                                                                                                                                                                                            |       |                           |                                   |                                                                                |
| G40  | Operation Time (OPERATE TIME) | R   | 0D 00:00 to 99999D 23:59                                                                                                                                                                                                       |       |                           |                                   | Operation time                                                                 |
| G41  | Alm Record1 (ALM RECORD1)     | R   | 10:uP Fault<br>11:EEPROM Fault<br>12:A/D(H) Fault<br>13:A/D(L) Fault<br>14:A/D(Z) Fault<br>15:Coil Open<br>16:EEPROM Dflt<br>18:Power Off<br>19:Inst Pwr Fail<br>28:WDT<br>30:Sig Overflow<br>31:Empty Pipe<br>33:Adhesion Alm |       |                           |                                   | Displays the details of the most recent alarm.                                 |
| G42  | Alm Record Time1 (ALM TIME 1) | R   | 0D 00:00 to 99999D 23:59                                                                                                                                                                                                       |       |                           |                                   | Displays the operation time at the occurrence of the most recent alarm.        |
| G43  | Alm Record2 (ALM RECORD2)     | R   | See G41                                                                                                                                                                                                                        |       |                           |                                   | Displays the details of the second most recent alarm.                          |
| G44  | Alm Record Time2 (ALM TIME 2) | R   | 0D 00:00 to 99999D 23:59                                                                                                                                                                                                       |       |                           |                                   | Displays the operation time at occurrence of the second most recent alarm.     |
| G45  | Alm Record3 (ALM RECORD3)     | R   | See G41                                                                                                                                                                                                                        |       |                           |                                   | Displays the details of the third most recent alarm.                           |
| G46  | Alm Record Time3 (ALM TIME 3) | R   | 0D 00:00 to 99999D 23:59                                                                                                                                                                                                       |       |                           |                                   | Displays the operation time at the occurrence of the third most recent alarm.  |
| G47  | Alm Record4 (ALM RECORD4)     | R   | See G41                                                                                                                                                                                                                        |       |                           |                                   | Displays the details of the fourth most recent alarm.                          |
| G48  | Alm Record Time4 (ALM TIME 4) | R   | 0D 00:00 to 99999D 23:59                                                                                                                                                                                                       |       |                           |                                   | Displays the operation time at the occurrence of the fourth most recent alarm. |
| G60  | — (SELF CHECK)                | R   | Good<br>Error                                                                                                                                                                                                                  |       |                           |                                   | Displays self-check result. See "6.5 Alarm Functions".                         |

T0608-2.EPS

**(8) Item H (Menu H): Display Setting items**

Menu H contains setting items that are relevant to display on the display unit.

| Item | Name                           | R/W | Data range                                                                                                                                                      | Units | Position of decimal point | Default value (*): Indicated item | Description                                                     |
|------|--------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------|-----------------------------------|-----------------------------------------------------------------|
|      | Display unit (BRAIN)           |     | Display unit /BRAIN                                                                                                                                             |       |                           |                                   |                                                                 |
| H00  | Display Set (DISP SET)         |     |                                                                                                                                                                 |       |                           |                                   |                                                                 |
| H10  | Display Select1 (DISP SELECT1) | W   | Flow Rate(%)<br>Flow Rate<br>Flow Rate(mA)<br>Forward Total<br>Reverse Total<br>Dif Total                                                                       |       |                           | Flow rate                         | Selects the first line for Display Mode. Linked with B40.       |
| H11  | Display Select2 (DISP SELECT2) | W   | Off<br>Flow Rate(%)<br>Flow Rate<br>Flow Rate(mA)<br>Flow Rate(Bar)<br>Forward Total<br>Reverse Total<br>Dif Total<br>Tag No<br>Adhesion Check<br>Communication |       |                           | Off                               | Selects the second line for Display Mode. Linked with B41.      |
| H12  | Display Select3 (DISP SELECT3) | W   | Same as H11 (Display Select2)                                                                                                                                   |       |                           | Off                               | Selects the third line for Display Mode. Linked with B42.       |
| H20  | Display Cycle (DISP CYCLE)     | W   | 200ms<br>400ms<br>1s<br>2s<br>4s<br>8s                                                                                                                          |       |                           | 400ms                             | Selects the display cycle.                                      |
| H30  | Language (LANGUAGE)            | W   | English<br>Japanese<br>French<br>German<br>Italian<br>Spanish                                                                                                   |       |                           | English                           | Selects the language used by the display unit. Linked with B10. |
| H60  | — (SELF CHECK)                 | R   | Good<br>Error                                                                                                                                                   |       |                           |                                   | Displays self-check result. See "6.5 Alarm Functions".          |

T0609.EPS

**(9) Item J (Menu J): Auxiliary Function Setting items**

Menu J contains setting items such as the flow direction, rate limits, and low cut.

| Item | Name                           | R/W | Data range            | Units | Position of decimal point | Default value (*): Indicated item | Description                                                                                                                                  |
|------|--------------------------------|-----|-----------------------|-------|---------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|      | Display unit (BRAIN)           |     | Display unit /BRAIN   |       |                           |                                   |                                                                                                                                              |
| J00  | Aux (AUX)                      |     |                       |       |                           |                                   |                                                                                                                                              |
| J10  | 4-20mA Low Cut (4-20 LOW CUT)  | W   | 0 to 10               | %     | 0                         | 0%                                | Sets the low cut range for 4-20 mA output                                                                                                    |
| J11  | 4-20mA Low Lmt (4-20 LOW LMT)  | W   | -20.0 to 100.0        | %     | 1                         | -20.0%                            | Sets the low limit for 4-20 mA output                                                                                                        |
| J12  | 4-20mA High Lmt (4-20 HI LMT)  | W   | 0.0 to 120.0          | %     | 1                         | 120.0%                            | Sets the high limit for 4-20 mA output                                                                                                       |
| J20  | Flow Direction (FLOW DIRECT)   | W   | Forward<br>Reverse    |       |                           | Forward                           | Selects the flow direction.                                                                                                                  |
| J21  | Rate Limit (RATE LIMIT)        | W   | 0 to 10               | %     | 0                         | 5%                                | Sets the level to reduce output fluctuation.                                                                                                 |
| J22  | Dead Time (DEAD TIME)          | W   | 0 to 15               | s     | 0                         | 0s                                | Sets the dead time to reduce output fluctuation. When "0" is set, "Rate limit" is not available.                                             |
| J23  | Pulsing Flow (PULSING FLOW)    | W   | No<br>Yes             |       |                           | No                                | Selects whether pulsing flow is to be supported.                                                                                             |
| J24  | T/P Damp Select (T/P DAMP SEL) | W   | Damping<br>No Damping |       |                           | Damping                           | Selects whether the flow rate value obtained through damping calculation for total/pulse or the instantaneous flow rate value is to be used. |

T0610-1.EPS

## 6. PARAMETER DESCRIPTION

| Item | Name                                   | R/W | Data range             | Units | Position of decimal point | Default value<br>(*): Indicated item | Description                                                                                          |
|------|----------------------------------------|-----|------------------------|-------|---------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------|
|      | Display unit<br>(BRAIN)                |     | Display unit<br>/BRAIN |       |                           |                                      |                                                                                                      |
| J30  | Power Synch *1)<br>(POWER SYNCH)       | W   | No<br>Yes              |       |                           | Yes                                  | Selects whether or not the internal frequency is to be synchronized with the power supply frequency. |
| J31  | Power Frequency<br>(POWER FREQ)<br>*1) | R/W | 47.00 to 63.00         | Hz    | 2                         | 50.00                                | Displays or sets the power-supply frequency (for Power Synch = Yes or No respectively).              |
| J40  | Memo 1<br>(MEMO 1)                     | W   | ASCII 16 characters    |       |                           |                                      | Memo field                                                                                           |
| J41  | Memo 2<br>(MEMO 2)                     | W   | ASCII 16 characters    |       |                           |                                      | Memo field                                                                                           |
| J42  | Memo 3<br>(MEMO 3)                     | W   | ASCII 16 characters    |       |                           |                                      | Memo field                                                                                           |
| J50  | Software Rev No<br>(SOFTWARE REV)      | R   | —                      |       |                           |                                      | Software revision number                                                                             |
| J60  | —<br>(SELF CHECK)                      | R   | Good<br>Error          |       |                           |                                      | Displays self-check result.<br>See “6.5 Alarm Functions”.                                            |

\*1) In situations when a DC power supply is used, set "No" for J30 and the local commercial power frequency for J31.

T0610-2.EPS

### (10) Item K (Menu K): Diagnostic Function Setting items

Menu K contains items that are relevant to the diagnosis of insulation adhesion to the electrode.

| Item | Name                                | R/W | Data range             | Units | Position of decimal point | Default value<br>(*): Indicated item | Description                                                               |
|------|-------------------------------------|-----|------------------------|-------|---------------------------|--------------------------------------|---------------------------------------------------------------------------|
|      | Display unit<br>(BRAIN)             |     | Display unit<br>/BRAIN |       |                           |                                      |                                                                           |
| K00  | Diagnosis<br>(DIAGNOSIS)            |     |                        |       |                           |                                      |                                                                           |
| K10  | Adhesion Check<br>(ADHESION CHK)    | W   | No<br>Yes              |       |                           | No                                   | Selects whether or not to perform diagnosis of adhesion to the electrode. |
| K11  | Adhesion Level1<br>(ADH LEVEL1)     | W   | 0.00 to 100.00         | M ohm | 2                         | 0.10                                 | Sets the Level 1 for the diagnosis of adhesion to the electrode.          |
| K12  | Adhesion Level2<br>(ADH LEVEL2)     | W   | 0.00 to 100.00         | M ohm | 2                         | 0.50                                 | Sets the Level 2 for the diagnosis of adhesion to the electrode.          |
| K13  | Adhesion Level3<br>(ADH LEVEL3)     | W   | 0.00 to 100.00         | M ohm | 2                         | 1.00                                 | Sets the Level 3 for the diagnosis of adhesion to the electrode.          |
| K14  | Adhesion Level4<br>(ADH LEVEL4)     | W   | 0.00 to 100.00         | M ohm | 2                         | 3.00                                 | Sets the Level 4 for the diagnosis of adhesion to the electrode.          |
| K15  | Adh Measure Value<br>(ADH MEAS VAL) | R   | —                      | M ohm | 2                         |                                      | Displays the diagnosis value for adhesion to the electrode.               |
| K60  | —<br>(SELF CHECK)                   | R   | Good<br>Error          |       |                           |                                      | Displays self-check result.<br>See “6.5 Alarm Functions”.                 |

T0611.EPS

### (11) Item M (Menu M): Automatic Zero-Adjustment Function Setting items

Menu M contains items that are relevant to automatic zero adjustment.

| Item | Name                            | R/W | Data range                | Units | Position of decimal point | Default value<br>(*): Indicated item | Description                                                                          |
|------|---------------------------------|-----|---------------------------|-------|---------------------------|--------------------------------------|--------------------------------------------------------------------------------------|
|      | Display unit<br>(BRAIN)         |     | Display unit<br>/BRAIN    |       |                           |                                      |                                                                                      |
| M00  | Adjustment<br>(ADJUSTMENT)      |     |                           |       |                           |                                      |                                                                                      |
| M10  | Auto Zero Exe<br>(AUTOZERO EXE) | W   | No Execution<br>Execution |       |                           | No Execution                         | Selects whether or not automatic zero adjustment is carried out.<br>Linked with B50. |
| M11  | Magflow Zero<br>(MAGFLOW ZERO)  | R/W | -99.999 to 99.999         |       | 3                         | 0.000                                | Displays and sets the amount of zero adjustment.<br>Displays self-check result.      |
| M60  | —<br>(SELF CHECK)               | R   | Good<br>Error             |       |                           |                                      | See “6.5 Alarm Functions”.                                                           |

T0612.EPS

**(12) Item N (Menu N): Loop Test Setting items**

Menu N contains items that are relevant to the execution of loop testing.

| Item | Name                                | R/W | Data range                            | Units | Position of decimal point | Default value<br>(*): Indicated item | Description                                               |
|------|-------------------------------------|-----|---------------------------------------|-------|---------------------------|--------------------------------------|-----------------------------------------------------------|
|      | Display unit<br>(BRAIN)             |     | Display unit<br>/BRAIN                |       |                           |                                      |                                                           |
| N00  | Test<br>(TEST)                      |     |                                       |       |                           |                                      |                                                           |
| N10  | Test Mode<br>(TEST MODE)            | W   | Normal<br>Test                        |       |                           | Normal                               | Selection of Normal Mode or<br>Test Mode.                 |
| N11  | Test Output Value<br>(TEST OUT VAL) | W   | -10 to 110                            | %     | 0                         | 0%                                   | Sets the test output value.                               |
| N30  | Test DO<br>(TEST DO)                | W   | Open(Off)<br>Closed(On)<br>Pulse      |       |                           | Open(Off)                            | Selects the test condition for<br>DO.                     |
| N31  | Test DIO (O)<br>(TEST DIO (O))      | W   | Input Mode<br>Open(Off)<br>Closed(On) |       |                           | Input Mode                           | Selects the test condition for<br>DIO (O).                |
| N32  | Test DIO (I)                        | R   | Open                                  |       |                           |                                      | Displays the test condition for<br>DIO (I).               |
| N60  | —<br>(SELF CHECK)                   | R   | Good<br>Error                         |       |                           |                                      | Displays self-check result.<br>See "6.5 Alarm Functions". |

T0613.EPS

**(13) Item P (Menu P): Parameter Protection items**

Menu P contains items that are relevant to write protection and passwords. If the password is lost you can break the password seal with the Joker Password".

The Joker Password is "YOKOGAWA".

| Item | Name                                | R/W | Data range             | Units | Position of decimal point | Default value<br>(*): Indicated item | Description                                                                                    |
|------|-------------------------------------|-----|------------------------|-------|---------------------------|--------------------------------------|------------------------------------------------------------------------------------------------|
|      | Display unit<br>(BRAIN)             |     | Display unit<br>/BRAIN |       |                           |                                      |                                                                                                |
| P00  | Protect<br>(PROTECT)                |     |                        |       |                           |                                      |                                                                                                |
| P10  | Key Code<br>(KEY CODE)              |     | 0 to 9999              |       |                           | 0                                    | Parameter display restriction                                                                  |
| P20  | Write Protect<br>(W PROTECT)        | R   | No<br>Yes              |       |                           | No                                   | Displays whether or not overwriting<br>of parameter data is prohibited.                        |
| P21  | Enable Wrt Passwd<br>(ENABLE WRITE) | W   | ASCII 8 characters     |       |                           |                                      | Permits password input so that the<br>prohibition of parameter overwriting<br>may be canceled. |
| P22  | New Password<br>(NEW PASSWORD)      | W   | ASCII 8 characters     |       |                           |                                      | Sets the password for suspension of the<br>prohibition of parameter overwriting.               |
| P23  | Software Seal<br>(SOFT SEAL)        | R   | Break<br>Keep          |       |                           |                                      | Displays whether or not a Joker<br>password was used (Break).                                  |
| P60  | —<br>(SELF CHECK)                   | R   | Good<br>Error          |       |                           |                                      | Displays self-check result.<br>See "6.5 Alarm Functions".                                      |

T0613-1.EPS

## 6.4 Parameter Description

### (1) Menu B: Easy Setup items

Those parameters with a high frequency of use have been grouped together in Easy Setup. All basic functions can be controlled using only the parameters from this block. Parameters from Menu B share identical names with those from other menus; however, modification of one such parameter will result in the other being automatically modified.

**[B10: Language]** Setting of parameter language  
→ This setting is linked with that of parameter **H30**. One of the following languages can be selected for use by the display unit. All Parameters, alarm messages etc are displayed in the selected language.

#### Data Range

English, French, German, Italian, Japanese, Spanish

**[B20: Flow Damping]** Setting of the damping time constant  
→ This setting is linked with that of parameter **C11**. The damping time constant should be modified to suppress an output fluctuation or to change the response time. This time constant has an effect on analog output and on the flow rate display (i.e., actual instantaneous flow rate, %, current value), and in addition, it also affects pulse output and totalization. However, when “No Damping” has been set for **J24: T/P Damp Select**, there will be no effect on pulse output or totalization.

\* Time constant: The time required for the output to reach 63.2 % from 0 %.

**[B21: Base Flow Unit]** Selection of flow rate units  
→ This setting is linked with that of parameter **C40**. This parameter selects the flow rate units. (In case of mass flow, the setting of density is also required. Refer to **C46: Mass Flow Density** for more details.)

**[B22: Base Time Unit]** Selection of time units  
→ This setting is linked with that of parameter **C41**. This parameter selects the time units; however, if “m” has been selected in B21 (or C40) for the flow rate units, “/s” is automatically set for this parameter.

**[B23: Flow Span]** Setting of the flow span  
→ This setting is linked with that of parameter **C42**. The span can be set for the forward flow rate in the range 0 to 32000 (although this does not include 0). The units set using **B21/C40: Base Flow Unit** and **B22/C41: Base Time Unit** will be displayed at this time.



#### NOTE

If the flow rate units, time units, and flow rate span are specified upon ordering, these parameters will be setup before shipment; however, if this is not the case, it will be necessary for the appropriate values to be set up by the user.



#### NOTE

Flow rate span is the value for instantaneous flow rate that corresponds to a current output of 20 mA. The following factors should be taken into consideration when deciding on the flow-rate span.

- In the case of applications with large variations in flow rate (noisy fluids, e.g. slurry), the maximum flow rate should be set. If a flow rate in excess of the flow rate span is occurring, output would be possible up to an upper limit of 108 %, and beyond this, error would occur. Note that the same applies to pulse output and totalization.
- In the case of applications that have a relatively stable flow rate, a flow rate span of 1.5 to 2.0 times larger than the normal flow rate may be considered suitable.
- The flow rate span to be adopted should - upon conversion to flow velocity - correspond to a value within the range of 0.1 to 10 m/s. The flow velocity can be confirmed using sizing data or with parameter **C44: Velocity Check**, and in the latter case, the value obtained when span is converted to flow velocity will be displayed.

**[B24: Flow Decimal Pnt]** Setting of the decimal point

→ This setting is linked with that of parameter **C43**. This parameter sets the position of the decimal point for instantaneous flow-rate values in terms of the number of digits. When set using “Auto”, the decimal point position will be automatically determined in accordance with the setting value for **B23/C42: Flow Span** as shown below.

|                                  |                                                            |
|----------------------------------|------------------------------------------------------------|
| FLOW SPAN $\leq 9$               | Decimal point position: 3 digits                           |
| $9 < \text{FLOW SPAN} \leq 90$   | Decimal point position: 2 digits                           |
| $90 < \text{FLOW SPAN} \leq 900$ | Decimal point position: 1 digit                            |
| $900 < \text{FLOW SPAN}$         | Decimal point position: no digits (i.e., no decimal point) |

When an item other than “Auto” is set, the selected number of digits for the decimal point position is used.

With the decimal point removed, 6 digits are available for the instantaneous flow-rate value, and display is possible up to 999,999. If an overflow occurs as a result of the setting adopted for decimal point position, the warning

**84: Disp Over Wng** will be displayed to provide notification of this condition.

**Example: When 1000 m<sup>3</sup>/h is set for B23/C42: Flow Span**

| Item | Display content for instantaneous flow rate value                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------------------|
| Auto | 1000 m <sup>3</sup> /h                                                                                                               |
| 0    | 1000 m <sup>3</sup> /h                                                                                                               |
| 1    | 1000.0 m <sup>3</sup> /h                                                                                                             |
| 2    | 1000.00 m <sup>3</sup> /h                                                                                                            |
| 3    | With the decimal point removed, 7 digits are not available for the instantaneous flow-rate value; therefore, a warning is displayed. |

T0615.EPS

**[B30: Total Unit]** Setting of units for totalization scale

→ This setting is linked with that of parameter **D10**. This parameter selects the flow-rate units for use in totalization.

| Item     | Description                                            |
|----------|--------------------------------------------------------|
| n Unit/P | $10^{-9} \times \text{BFU}$                            |
| u Unit/P | $10^{-6} \times \text{BFU}$                            |
| m Unit/P | $10^{-3} \times \text{BFU}$                            |
| Unit/P   | BFU                                                    |
| k Unit/P | $10^3 \times \text{BFU}$                               |
| M Unit/P | $10^6 \times \text{BFU}$                               |
| Pulse/s  | Number of pulses output for one second at 100% output. |

BFU: Base Flow Unit selected in B21/C40

T0616.EPS

**[B31: Total Scale]** Setting of the totalization scale

→ This setting is linked with that of parameter **D11**. The flow rate is totalized in individual counts in accordance with this parameter's setting. If 0 is selected, it indicates that the totalization function is not to be used.



**NOTE**

If a totalization scale is specified upon ordering, this parameter is set up before shipment; however, if this is not the case, it will be necessary for the appropriate value to be set up by the user.



**NOTE**

- By setting the scale of the totalization pulse, the flow rate totalized value is displayed on the display unit. The totalization scale is determined in accordance with the settings of **B30/D10: Total Unit** and **B31/D11: Total Scale**.
- The maximum value that can be displayed is 99999999. If this value is exceeded, the totalizer rolls over to 0 and will start counting again. However, counting stops at 99999999 when the totalization switch function is used.
- If multiple ranges are being used, the flow rate span for the smallest range becomes the standard for the **D13: Total Low Cut** setting value.
- Totalization for the reverse direction and for the differential flow rate is carried out only when “Fwd/Rev Ranges” is selected for **F20: DO Function** or **F21: DIO Function**.
- The totalized units are indicated on the display unit when **B31/D11** is 0.001, 0.01, 0.1, 1, 10, 100, or 1000. In the case of other setting values, the totalized units are not indicated.

Example 1: To count in 1 MI (mega-liter) steps with flow rate span = 100 m<sup>3</sup>/h  
Since 1 MI =  $10^3 \times \text{m}^3$ , k Unit/P is set for **B30/D10**, and 1 is set for **B31/D11**. “x10<sup>3</sup> m<sup>3</sup>” is indicated for the totalized units in the Display Mode.

Example 2: To count in 10 l (liter) steps with flow rate span = 100 m<sup>3</sup>/h  
Since 1 l =  $10^{-3} \times \text{m}^3$ , m Unit/P is set for **B30/D10**, and 10 is set for **B31/D11**. “x10<sup>-2</sup> m<sup>3</sup>” is indicated for the totalized units in the Display Mode.

Example 3: To count in 5 l (liter) steps with flow rate span = 100 m<sup>3</sup>/h  
Since 1 l =  $10^{-3} \times \text{m}^3$ , m Unit/P is set for **B30/D10**, and 5 is set for **B31/D11**. Since **B31/D11** is not 0.001, 0.01, 0.1, 1, 10, 100, or 1000, there is no indication of totalized units in the Display Mode.

## 6. PARAMETER DESCRIPTION

- Setting of totalization scale is not possible when specific selections have been made for **B30/D10: Total Unit**, **B31/D11: Total Scale**, and **B23/C42: Flow Span**. In such a case, a setting alarm will be displayed, and parameters should be changed in accordance with the instructions given.

**[B32: Pulse Unit]** Setting of the pulse multiplier  
→ This setting is linked with that of parameter **E10**. This parameter selects an engineering multiplier for the pulse referenced to the Base Flow Unit selected in B21 / C40.

| Item     | Description                                            |
|----------|--------------------------------------------------------|
| n Unit/P | $10^{-9} \times \text{BFU}$                            |
| u Unit/P | $10^{-6} \times \text{BFU}$                            |
| m Unit/P | $10^{-3} \times \text{BFU}$                            |
| Unit/P   | BFU                                                    |
| k Unit/P | $10^3 \times \text{BFU}$                               |
| M Unit/P | $10^6 \times \text{BFU}$                               |
| Pulse/s  | Number of pulses output for one second at 100% output. |

BFU: Base Flow Rate Unit selected in B21/C40

T0617.EPS

**[B33: Pulse Scale]** Setting of pulse scale  
→ This setting is linked with that of parameter **E11**. Pulse output is performed in individual counts in accordance with this parameter's setting. If 0 is selected, it indicates that the pulse output function is not to be used.



### NOTE

If a pulse scale is specified upon ordering, this parameter is setup before shipment; however, if this is not the case, it will be necessary for the appropriate value to be setup by the user.



### NOTE

- By setting the scale of the pulse, pulse output performs. The pulse scale is determined in accordance with the settings of **B32/E10: Pulse Unit** and **B33/E11: Pulse Scale**.
- If multiple ranges are being used, the flow rate span for the smallest range becomes the standard for the **E13: Pulse Low Cut** setting value.
- Pulse output for the reverse direction is carried out only when "Fwd/Rev Ranges" is selected for **F20: DO Function** or **F21: DIO Function**.

- Setting of pulse output is not possible when specific selections have been made for **B32/E10: Pulse Unit**, **B33/E11: Pulse Scale**, **E12: Pulse Width** and **B23/C42: Flow Span**. In such a case, a setting alarm will be displayed, and parameters should be changed in accordance with the instructions given.

Example 1: To perform pulse output in 1 Ml (mega-liter) steps with flow rate span =  $100 \text{ m}^3/\text{h}$   
Since  $1 \text{ Ml} = 10^3 \times \text{m}^3$ , M Unit/P is set for **B32/E10**, and 1 is set for **B33/E11**.

Example 2: To perform pulse output in 10 l (liter) steps with flow rate span =  $100 \text{ m}^3/\text{h}$   
Since  $1 \text{ l} = 10^{-3} \times \text{m}^3$ , m Unit/P is set for **B32/E10**, and 10 is set for **B33/E11**.

Example 3: To perform pulse output in 5 l (liter) steps with flow rate span =  $100 \text{ m}^3/\text{h}$   
Since  $1 \text{ l} = 10^{-3} \times \text{m}^3$ , m Unit/P is set for **B32/E10**, and 5 is set for **B33/E11**.

**[B40: Display Select1]** First line of display unit  
→ This setting is linked with that of parameter **H10**. This parameter selects the display content for the display unit's first line. The size of the characters which are displayed will depend on the selections made for **B41/H11: Display Select2** and **B42/H12: Display Select3** as described below. (For more details, refer to Chapter 5: Basic Operating Procedures.)



### CAUTION

It is not possible to set Display Select1 to "Off".

**[B41: Display Select2]** Second line of display unit  
→ This setting is linked with that of parameter **H11**. This parameter selects the display content for the display unit's second line. When "Off" is selected, one-line display will be adopted regardless of the setting made for **B42/H12: Display Select 3**.

**[B42: Display Select3]** Third line of display unit  
→ This setting is linked with that of parameter **H12**. This parameter selects the display content for the display unit's third line. When "Off" is selected for this parameter, two-line display is adopted.

**[B50: Auto Zero Exe]** Execution of the automatic zero adjustment function

→ This setting is linked with that of parameter **M10**. This parameter executes the automatic zero adjustment function: If “Execution” is selected, this function will be started. “Now Auto Zero Executing...” is indicated while the Auto Zero function is being carried out. The result of the automatic zero adjustment is confirmed using **M11: Magflow Zero**, and if the result exceeds the rated value, the warning **82: Auto Zero Wng** will be displayed. (For more details, refer to Chapter 9: Operation.)

| Setting      | Function                              |
|--------------|---------------------------------------|
| No Execution | No execution                          |
| Execution    | Automatic zero adjustment is started. |

T0643-1.EPS

## (2) Menu C: Basic Setting items

Menu C principally contains the basic setting items for the flowtube.



### NOTE

In order to ensure that correct flow rate data can be acquired, it is crucial that the nominal size, flow rate span, and meter factor of the combined remote flowtube are set. In cases where a remote flowtube is ordered at the same time as the AXFA14, or where the AXF integral flowmeter is ordered, the nominal size and meter factor will be set upon shipment from the manufacturing plant, and these will not require additional setting. If the AXFA14 is ordered separately, the default value will be set for the meter factor; accordingly, it will be necessary to change this setting to the meter factor indicated on your remote flowtube data plate. If a flow rate span was specified upon ordering, this will be set before shipment. If this is not the case, however, it will be necessary for the appropriate value to be set by the user.

**[C10: Tag No]** Setting of the tag number

→ The setting for this parameter corresponds to one of the ordered items.

Up to a maximum of 16 characters can be entered for the display unit. For more details regarding the actual characters that can be used, refer to Section 5.2.2: Setting Mode.



### NOTE

If a tag number is specified upon ordering, this parameter [C10] is set up before shipment; Up to 16 digits are programmable, and up to 16 digits can be displayed on the meter display if a display was ordered. The number programmed in [C10] is then identical to the tag number on the data plate. If additionally to the tag number a software tag number was specified upon ordering the software tag number is the number that will be programmed in [C10]. The possible length for programming a software tag number depends on the communication code.

AXFA14□-D = BRAIN : up to 16 digits

AXFA14□-E = HART : up to 8 digits

AXFA14□-F = Foundation Fieldbus : up to 32 digits

If value was not set to your requirements, it will be necessary for the appropriate value to be set by the user.

**[C11: Flow Damping]** → Refer to the description of parameter **B20**.

**[C20: Measure Mode]** Selection of excitation mode

| Item        | Description                        |
|-------------|------------------------------------|
| Standard DF | Standard dual frequency excitation |
| Enhanced DF | Enhanced dual frequency excitation |

T0618.EPS

Enhanced DF (i.e., enhanced dual frequency excitation) is set to stabilize measurement for difficult applications, such as for high concentration slurry or low conductivity fluid. Note that this parameter is only valid when this product is used in combination with an AXF flowtube, as only those flowtubes will support the enhanced dual frequency excitation. (Options:/HF2)



### NOTE

When this product is used in combination with any flowtube that does not support enhanced dual frequency excitation and “Enhanced DF” is selected, a setting alarm will be displayed. The setting should be returned to “Standard DF” in such a case.

## 6. PARAMETER DESCRIPTION

**[C21: Low MF]** Setting of the low-frequency meter factor

This parameter sets the low-frequency meter factor.

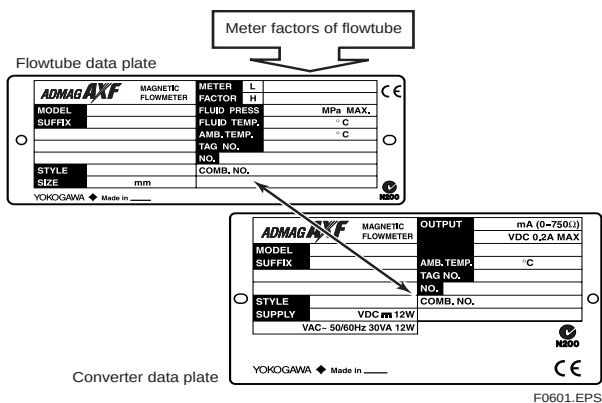
**[C22: High MF]** Setting of the high-frequency meter factor

This parameter sets the high-frequency meter factor.



### NOTE

#### Meter Factor Settings



- (1) Confirm that the serial number indicated by COMB. NO. on the AXFA14 converter's data plate corresponds with the AXF remote flowtube's serial number.
- (2) Set the values that are marked in the METER FACTOR fields on the data plate for the Remote Flowtube.
- (3) The meter factors are crucial in ensuring that the electromotive force is correctly in proportion to the flow velocity and are determined at the manufacturing plant by actual-flow calibration.



### NOTE

For the AXF integral flowmeter, refer also to "Section 6.6: Precautions for the AXF integral flowmeter."

**[C23: Low MF (EDF)]** Setting of the low-frequency meter factor for EDF

This parameter sets the low-frequency meter factor as required when Enhanced DF (i.e., enhanced dual frequency excitation) is selected. If "Standard DF" has been selected for **C20: Measure Mode**, neither **C23: Low MF (EDF)** nor **C24: High MF**

(EDF) is displayed, and if "Enhanced DF" is selected, the four parameters from **C21** to **C24** will be displayed.

**[C24: High MF (EDF)]** Setting of the high-frequency meter factor for EDF

This parameter sets the high-frequency meter factor as required when Enhanced DF (i.e., enhanced dual frequency excitation) is selected.

**[C31: Nominal Size Unit]** Setting of the nominal size units

This parameter selects the units used for setting of the nominal size.

**[C32: Nominal Size]** Setting of the nominal size

This parameter sets the nominal size of flowtube.

**[C40: Base Flow Unit]** → Refer to the description of parameter **B21**.

**[C41: Base Time Unit]** → Refer to the description of parameter **B22**.

**[C42: Flow Span]** → Refer to the description of parameter **B23**.

**[C43: Flow Decimal Pnt]** → Refer to the description of parameter **B24**.

**[C44: Velocity Check]** Display of the span flow velocity

This parameter displays the span for the maximum range in m/s units.

**[C45: Density Unit]** Setting of the density units

This parameter selects the units for density as required when making settings using

**C46: Mass Density**.

**[C46: Mass Density]** Setting of the density for mass flow rate

This parameter is necessary in situations where t, kg, g, klb or lb has been selected as the mass unit in **B21/C40: Base Flow Unit**. If a mass unit is selected in **B21/C40: Base Flow Unit** and a value of 0 is set for this parameter, the setting alarm "**57: Density Set Err.**" will be displayed. In such a case, ensure that the density is set correctly.

**[C47: User Span Select]** Selection of the special setting for units

This parameter selects whether or not special units setting can be performed for instantaneous flow rate. Actual setting of these units is carried out using **C48: Flow User Unit** and **C49: Flow User Span**.

**[C48: Flow User Unit]** Setting of the special units  
This parameter is used to select the special units up to maximum 8 characters. These units are displayed when instantaneous flow rate is selected in the Display Mode, and they are displayed for **A11: FLOW RATE** when BRAIN communication is being carried out.

**[C49: Flow User Span]** Setting of the special span  
This parameter sets the special span to be displayed for 100% output in the maximum range.

### (3) Menu D: Total Setting items

Menu D contains parameters that are relevant to totalization function settings.

**[D10: Total Unit]** Setting of units for totalization scale → Refer to the description of parameter **B30**.

**[D11: Total Scale]** Setting of the totalization scale → Refer to the description of parameter **B31**.

**[D12: Total Decimal Pnt]** Setting of the decimal point position  
This parameter sets the position of the decimal point for totalization display in terms of the number of digits. Except in cases where 0 is selected, the totalized units are not displayed.

Example: When totalized value is 12345678 m<sup>3</sup>

| Item | Totalization display    |
|------|-------------------------|
| 0    | 12345678 m <sup>3</sup> |
| 1    | 1234567.8               |
| 2    | 123456.78               |
| 3    | 12345.678               |
| 4    | 1234.5678               |
| 5    | 123.45678               |
| 6    | 12.345678               |
| 7    | 1.2345678               |

T0619.EPS

**[D13: Total Low Cut]** Setting of the totalization stop range

This parameter allows the settings to be made that prevent totalization when the flow rate is at or below the low-cut setting value. In cases where there are multiple ranges or forward/reverse ranges, low cut is carried out at the setting value for the smallest span (i.e. an integer between 0 and 100 %).  
Example: When the first range = 10 m<sup>3</sup>/h, the second range = 100 m<sup>3</sup>/h, and the Total Low Cut = 3 %, no totalization is carried out at flow rates of 0.3 m<sup>3</sup>/h or lower.

**[D20: Total Execution]** Operation setting for the totalization function

This parameter sets start and stop of the totalization function, in addition to setting presets (i.e., fixed values) for the forward totalized value and the reverse totalized value.

\*: The preset function starts the count for totalization from the set value.

| Item                  | Description                                                                                                                                                           |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Start (initial value) | Starts totalization                                                                                                                                                   |
| Stop                  | Stops totalization                                                                                                                                                    |
| Preset Total          | Adopts the preset value that has been specified as the forward totalized value. Setting of zero as the preset value allows the zero-reset function to be implemented. |
| Preset Rev Total      | Adopts the preset value that has been specified as the reverse totalized value.                                                                                       |

T0620.EPS

Preset values are set using **D21: Ttl Set Val Lower** and **D22: Ttl Set Val Upper**.



#### NOTE

Totalization presets can also be set up by using status input. For details regarding the setting method, refer to the descriptions of **F21**.

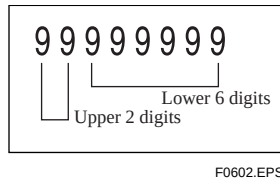
**[D21: Ttl Set Val Lower]** Setting of the totalization preset (lower)

This parameter sets a totalization preset value in the lower 6 digits of the 8-digit totalized value. If zero is to be set as the preset value, "000000" should be set here.

## 6. PARAMETER DESCRIPTION

**[D22: Ttl Set Val Upper]** Setting of the totalization preset (upper)

This parameter sets a totalization preset value in the upper 2 digits of the 8-digit totalized value. If zero is to be set as the preset value, "00" should be set here.



**[D23: Ttl Switch Lower]** Setting of the lower 6 digits of the totalization switch value

The totalization switch function operates to set the status output terminal (i.e., DO or DIO) to "Closed (On)" when the forward internal totalized value reaches or exceeds the set value. (For details regarding the setting method for the status output, refer to the descriptions of parameters **F20** and **F21**.)

If this function is set up, the totalization count will stop at 99999999. **D23** sets the lower 6 digits of the value for the totalization switch.

**[D24: Ttl Switch Upper]** Setting of the upper 2 digits of the totalization switch value

This parameter sets the upper 2 digits of the value for the totalization switch.

**[D30: Ttl User Select]** Setting of special unit selectability

This parameter specifies whether special units may be set for totalization. Actual setting of these units is carried out using **D31: Ttl User Unit**.

**[D31: Ttl User Unit]** Setting of special units  
Units of up to 8 characters in length can be specified using this parameter. The units set with this parameter are displayed whenever totalization (i.e., FTL, RTL, DTL) is selected in the Display Mode, and they are displayed for **A30: TOTAL**, **A31: REV. TOTAL**, and **A32: DIF. TOTAL** when BRAIN communication is being carried out.



### NOTE

Example: To count in 1 dl (deci-liter) steps with flow rate span=10 l/s.  
Since 1 dl (deci-liter) = 0.1 l (liter), "l (Liter)" is set for **B21/C40: Base Flow Unit**,  
"/s" is set for **B22/C41: Base Time Unit**,  
"10" is set for **B23/C42: Flow Span**,  
"Unit/P" is set for **B30/D10: Total Unit**,  
"0.1" is set for **B31/D11: Total Scale**,  
"Yes" is set for **D30: Ttl User Select**,  
"dl" is set for **D31: Ttl User Unit**.  
"dl" is indicated for the totalized units in the Display Mode and is counted in 1 dl steps.

## (4) Menu E: Pulse Setting items

Menu E contains items relevant to pulse output.



### NOTE

For pulse output from the DO terminal, set **F20: DO Function** to "Pulse Output."

**[E10: Pulse Unit]** Setting of the pulse units  
→ Refer to the description of parameter **B32: Pulse Unit**

**[E11: Pulse Scale]** Setting of the pulse scale  
→ Refer to the description of parameter **B33: Pulse Scale**

**[E12: Pulse Width]** Setting of the pulse width  
This parameter selects the pulse width (i.e., p/s : pulses per second) that is output.

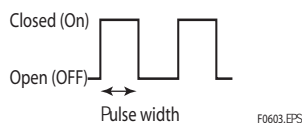
### Data Range

| Setting      | Pulse Scale (p/s) |                                    |
|--------------|-------------------|------------------------------------|
|              | Maximum Value     | Minimum Value                      |
| (0) 50% Duty | 11000             | 0.0001<br>(p/s: pulses per second) |
| (1) 0.05ms   | 10000             |                                    |
| (2) 0.1ms    | 5000              |                                    |
| (3) 0.5ms    | 1000              |                                    |
| (4) 1ms      | 500               |                                    |
| (5) 20ms     | 25                |                                    |
| (6) 33ms     | 15                |                                    |
| (7) 50ms     | 10                |                                    |
| (8) 100ms    | 5                 |                                    |

T0621.EPS

**NOTE**

\*:The pulse widths with the exception of 50% Duty is the "Closed (On)" time for each pulse in case that "Closed (On) Act" is selected for F22: DO Active Mode.



A limit applies to the maximum pulse scale that can be set with respect to the pulse width. If a value in excess of this limit is set, a setting alarm will be displayed.

**[E13: Pulse Low Cut]** Setting of the pulse-output stop range

This parameter allows the settings to be made which prevent pulse output when the flow rate is at or below the low-cut setting value. In cases where there are multiple ranges or forward/reverse ranges, low cut is carried out at the setting value for the smallest span (i.e., an integer between 0 and 100 %).

Example: When the first range = 10 m<sup>3</sup>/h, the second range = 100 m<sup>3</sup>/h, and the Pulse Low Cut = 3 %, no pulse output is carried out at flow rates of 0.3 m<sup>3</sup>/h or lower.

**(5) Menu F: Status Functions Setting items**

Menu F contains setting items relevant to status Input/Output.

**[F20: DO Function]** Setting of the DO status output terminal

This parameter sets the function allocation for the DO (status output) terminal.

| Setting          | Function                                                | Description                                                                                                                                                                                                                                                                                                                                           |
|------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No Function      | Stops output (i.e., inactive condition)                 | As no function is set, there is no output.                                                                                                                                                                                                                                                                                                            |
| Pulse Output     | Pulse output                                            | Pulse output is carried out.                                                                                                                                                                                                                                                                                                                          |
| Alarm Output     | Output upon alarm                                       | Refer to Alarms (Section 6.5).                                                                                                                                                                                                                                                                                                                        |
| Warning Output   | Output upon warning                                     |                                                                                                                                                                                                                                                                                                                                                       |
| Total Switch (O) | Totalization switch output                              | Status output is carried out when the forward internal totalized value reaches or exceeds the set limit value. Limit values are determined using <b>D23: Ttl Switch Lower</b> and <b>D24: Ttl Switch Upper</b> .                                                                                                                                      |
| H/L Alarm (O)    | H/L alarm output                                        | Status output is carried out when the flow rate equals or falls below the low flow-rate limit (L), or when it equals or exceeds the high flow-rate limit (H). These limit values are determined using <b>G10: Low Alarm</b> and <b>G11: High Alarm</b> .                                                                                              |
| HH/LL Alarm (O)  | HH/LL alarm output                                      | Status output is carried out when the flow rate equals or falls below the low-low flow-rate limit (LL), or when it equals or exceeds the high-high flow-rate limit (HH). These limit values are determined using <b>G12: Low Low Alarm</b> and <b>G13: High-High Alarm</b> . To output "HH/LL Alarm" as an alarm, set <b>G33: Alm-HH/LL</b> to "Yes". |
| Fwd/Rev Rngs (O) | Forward/reverse flow-rate measurement                   | When flow is in the reverse direction, switching to the reverse range is carried out automatically, measurement is performed, and status output is carried out.                                                                                                                                                                                       |
| Auto 2 Rngs (O)  | Automatic 2-range switching                             | This function ensures that when the input exceeds 100% of the range, transition to the next range is carried out automatically. Status output is carried out upon range switching.                                                                                                                                                                    |
| Auto 3 Rngs (O)  | Automatic 3-range switching (Note 1)                    |                                                                                                                                                                                                                                                                                                                                                       |
| Auto 4 Rngs (O)  | Automatic 4-range switching (Note 1)                    |                                                                                                                                                                                                                                                                                                                                                       |
| Ext 2 Answer (O) | Answerback: 2-range switching via external status input | When range switching is carried out in response to external status input, status output is performed in the form of an answerback to indicate the range currently being used.                                                                                                                                                                         |

Note 1: When these functions are selected, two terminals become necessary for status output, the DO and DIO terminals which cannot be used for other functions. Accordingly, the setting for **F20: DO Function** is automatically adopted as the setting for **F21: DIO Function**. (Setting of these two functions is not possible using **F21: DIO Function**.)

T0622.EPS

## 6. PARAMETER DESCRIPTION

### [F12: DIO Function] Setting of the DIO status input/output terminal

This parameter sets the function allocation for the DIO (status input/output) terminal.

| Setting             | Function                                                | Description                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No Function         | No function                                             | As no function is set, there is no input and output.                                                                                                                                                                                                                                                                                                             |
| Alarm Output        | Output upon alarm                                       | Refer to Alarms (Section 6.5).                                                                                                                                                                                                                                                                                                                                   |
| Warning Output      | Output upon warning                                     |                                                                                                                                                                                                                                                                                                                                                                  |
| Total Switch (O)    | Totalization switch output                              | Status output is carried out when the forward internal totalized value reaches or exceeds the set limit value. Limit values are determined using D23: Ttl Switch Lower and D24: Ttl Switch Upper.                                                                                                                                                                |
| H/L Alarm (O)       | H/L alarm output                                        | Status output is carried out when the flow rate equals or falls below the low flow-rate limit (L), or when it equals or exceeds the high flow-rate limit (H). These limit values are determined using G10: Low Alarm and G11: High Alarm.                                                                                                                        |
| HH/LL Alarm (O)     | HH/LL alarm output                                      | Status output is carried out when the flow rate equals or falls below the low-low flow-rate limit (LL), or when it equals or exceeds the high-high flow-rate limit (HH). These limit values are determined using G12: Low Low Alarm and G13: High-High Alarm. To output "HH/LL Alarm" as an alarm, set G33: Alm-HH/LL to "Yes"                                   |
| Fwd/Rev Rngs (O)    | Forward/reverse flow rate measurement                   | When flow is in the reverse direction, switching to the reverse range is carried out automatically, measurement is performed, and status output is carried out.                                                                                                                                                                                                  |
| Auto 2 Rngs (O)     | Automatic 2-range switching                             | This function ensures that when the input exceeds 100 % of the range, transition to the next range is carried out automatically. Status output is carried out upon range switching.                                                                                                                                                                              |
| Auto 3 Rngs (O)     | Automatic 3-range switching (Note 1)                    |                                                                                                                                                                                                                                                                                                                                                                  |
| Auto 4 Rngs (O)     | Automatic 4-range switching (Note 1)                    |                                                                                                                                                                                                                                                                                                                                                                  |
| Ext 2 Answer (O)    | Answerback: 2-range switching via external status input | When range switching is carried out in response to external status input, status output is performed in the form of an answerback to indicate the range currently being used.                                                                                                                                                                                    |
| 0 % Signal Lock (I) | 0 % signal lock via external status input               | Based on the external status input, the instantaneous flow rate indication is forcibly set to 0 % (i.e., 4 mA), and both totalization and pulse outputs are stopped. This setting has precedence over the output signal whenever an error occurs. When the 0% signal lock is canceled, the time constant originally set using B20/C11: Flow Damping is restored. |
| Ext Auto Zero (I)   | Automatic zero adjustment via external status input     | Automatic zero adjustment is carried out in response to external status input. For more details regarding automatic zero adjustment, refer to Chapter 9: Operation.                                                                                                                                                                                              |
| Ext Ttl Set (I)     | Forward totalization preset via external status input   | The totalization display value is preset or reset to zero in accordance with the external status input. The preset value is determined using D21: Ttl Set Val Lower and D22: Ttl Set Val Upper.                                                                                                                                                                  |
| Ext R Ttl Set (I)   | Reverse totalization preset via external status input   |                                                                                                                                                                                                                                                                                                                                                                  |
| Ext 2 ranges (I)    | 2-range switching via external status input             | This function allows the switching of 2 ranges in response to status input for a single direction only.                                                                                                                                                                                                                                                          |

Note 1: When these functions are selected, two terminals become necessary for status output, the DO and DIO terminals which cannot be used for other functions.

T0623.EPS

**[F22: DO Active Mode]** Setting of the active mode for DO terminal

Operations are performed in accordance with the following table when the active mode has been set to “Closed (On) Act” using this parameter.

Operating patterns are reversed when the active mode has been set to “Open (Off) Act.”

| Selected function                | DO terminal status                 |                                     |
|----------------------------------|------------------------------------|-------------------------------------|
|                                  | Open (Off)                         | Closed (On)                         |
| Pulse Output (see Example 1)     | Open (Off) when pulses are output. | Closed (On) when pulses are output. |
| Alarm Output (see Example 2)     | Good (normal)                      | Alarm status                        |
| Warning Output                   | Good (normal)                      | Warning status                      |
| Total Switch (O) (see Example 3) | Below setting value                | Equal or above setting value        |
| H/L Alarm (O)                    | Normal                             | H/L alarm status                    |
| HH/LL Alarm (O)                  | Normal                             | HH/LL alarm status                  |
| Fwd/Rev Rngs (O)                 | Forward direction                  | Reverse direction                   |

T0624.EPS

**[F23: DIO Active Mode]** Setting of the active mode for DIO terminal

Operations are performed in accordance with the following table when the active mode has been set to “Closed/Short Act” using this parameter. Operating patterns are reversed when the active mode has been set to “Open/Open Act.”

| Selected function               | Condition of DIO (O) terminal |                              |
|---------------------------------|-------------------------------|------------------------------|
|                                 | Open (Off)                    | Closed (On)                  |
| Alarm Output (see Example 2)    | Good (normal)                 | Alarm status                 |
| Warning Output                  | Good (normal)                 | Warning status               |
| Total Switch(O) (see Example 3) | Below setting value           | Equal or above setting value |
| H/L Alarm(O)                    | Normal                        | H/L alarm status             |
| HH/LL Alarm(O)                  | Normal                        | HH/LL alarm status           |
| Fwd/Rev Rngs(O)                 | Forward direction             | Reverse direction            |

Note: For “Auto 2 Rngs(O),” “Auto 3 Rngs(O),” “Auto 4 Rngs(O),” and “Ext 2 Answer(O),” see the **Multiple ranges setting** section.

T0625.EPS

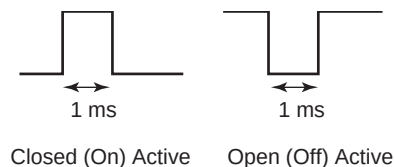
| Selected function                  | Condition of DIO (I) terminal |                                    |
|------------------------------------|-------------------------------|------------------------------------|
|                                    | Open                          | Short                              |
| 0% Signal Lock (I) (see Example 4) | Normal                        | Signal locked status               |
| Ext Auto Zero (I)                  | Normal                        | Start of automatic zero adjustment |
| Ext Ttl Set (I)                    | Normal                        | Forward totalization preset        |
| Ext R Ttl Set (I)                  | Normal                        | Reverse totalization preset        |

Note: For “Ext 2 Ranges(I),” see the **Multiple ranges setting** section.

\*: “DIO (O)” indicates DIO function is used for output. “DIO (I)” indicates DIO function is used for input.

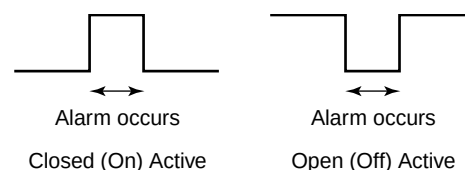
T0626.EPS

Example 1: When the “Pulse Output” function is selected for the DO terminal and the **E12: Pulse Width** is 1 ms, the following signals are output from the terminal.



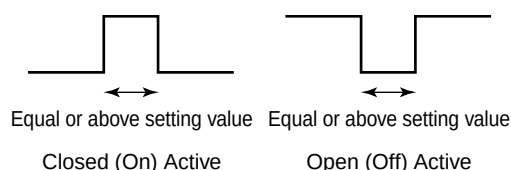
F0604-1.EPS

Example 2: When the “Alarm Output” function is selected for the DO or DIO (O) terminal, the following signals are output from the terminal.



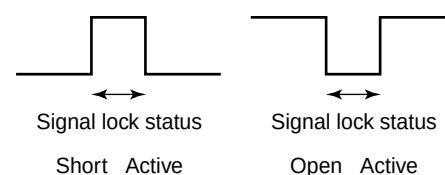
F0604-2.EPS

Example 3: When the “Total Switch (O)” function is selected for the DO or DIO (O) terminal, the following signals are output from the terminal.



F0604-3.EPS

Example 4: When the “0% Signal Lock (I)” function is selected for the DIO (O) terminal, the following signals are input to the terminal.



F0604-4.EPS

**NOTE****Multiple ranges setting**

Parameters from **F30** to **F41** are used with the automatic multiple ranges and the multiple ranges switching via an external status input. The followings will describe the setting method for each range.

The multiple ranges use the following parameters:

**[B23: Flow Span]** Setting of the flow rate span

[Setting of the forward No. 1 range]

**[F30: Forward Span 2]** Setting of the forward No.2. range

**[F31: Forward Span 3]** Setting of the forward No.3 range

**[F32: Forward Span 4]** Setting of the forward No.4 range

**[F33: Reverse Span 1]** Setting of the reverse No.1 range

**[F34: Reverse Span 2]** Setting of the reverse No.2 range

**[F40: Auto Range Hys]** Setting of the automatic multiple ranges hysteresis width.

**[F41: Bi Direction Hys]** Setting of the forward/reverse flow measurement hysteresis

**Multiple Ranges Setting 1:****Automatic multiple ranges switching**

- When the input exceeds 100% of the range, transition to the next range (up to four ranges) is carried out automatically. Furthermore, when the flow is in reverse, the reverse range is automatically selected.
- Range switching can be confirmed according to the status of the DO and DIO status output terminals. Refer to Table 6.4.1: Status Output for Automatic Range Switching for details of status output conditions for each range.

**Status Output for Automatic Multiple Ranges Switching**

Operations are performed in accordance with the following table when the active mode has been set to “Closed (On) Act” using **F22: DO Active Mode** or “Closed/Short Act” using **F23: DIO Active Mode**. Operating patterns are reversed when the active mode has been set to “Open (Off) Act” using **F22: DO Active Mode** or “Open/Open Act” using **F23: DIO Active Mode**.

**Table 6.4.1 Status Output for Automatic Multiple Ranges Switching**

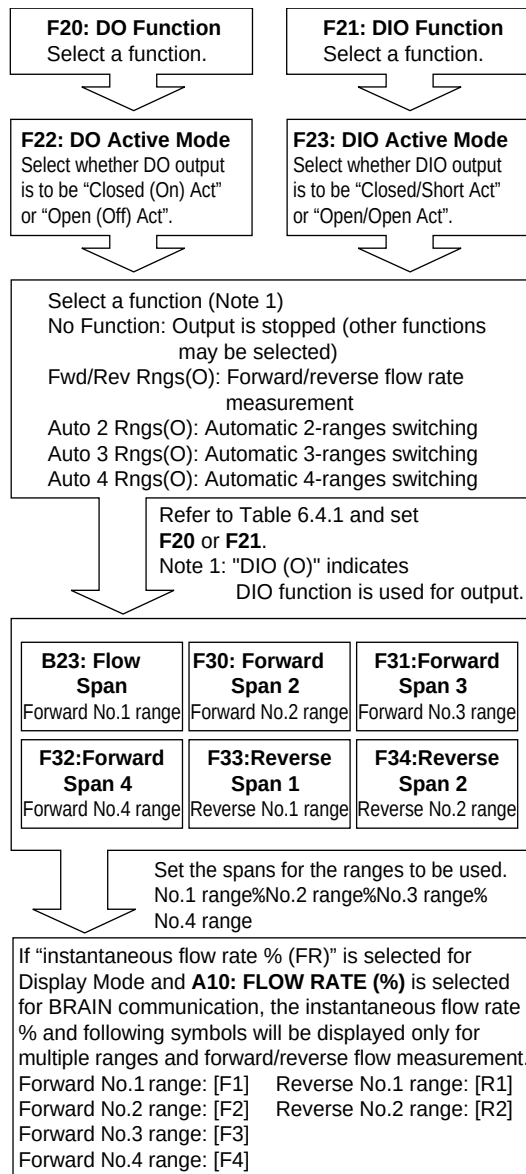
| Parameter setting |                  | Function                      | Status output   |         |         |
|-------------------|------------------|-------------------------------|-----------------|---------|---------|
| F20               | F21              |                               | DO              | DIO     |         |
|                   |                  |                               |                 | DIO (O) | DIO (I) |
| No Function       | No Function      | Forward single range          | –               | –       | –       |
| Fwd/Rev Rngs (O)  | No Function      | Auto forward/reverse 1 range  | Forward         | Open    | –       |
|                   |                  |                               | Reverse         | Closed  | –       |
| No Function       | Fwd/Rev Rngs (O) |                               | Forward         | –       | Open    |
|                   |                  |                               | Reverse         | –       | Closed  |
| Auto 2 Rngs (O)   | No Function      | Auto forward 2 ranges         | Forward 1 range | Open    | –       |
|                   |                  |                               | Forward 2 range | Closed  | –       |
| No Function       | Auto 2 Rngs (O)  |                               | Forward 1 range | –       | Open    |
|                   |                  |                               | Forward 2 range | –       | Closed  |
| Auto 3 Rngs (O)   | Auto 3 Rngs (O)  | Auto forward 3 ranges         | Forward 1 range | Open    | Open    |
|                   |                  |                               | Forward 2 range | Closed  | Open    |
|                   |                  |                               | Forward 3 range | Open    | Closed  |
| Auto 4 Rngs (O)   | Auto 4 Rngs (O)  | Auto forward 4 ranges         | Forward 1 range | Open    | Open    |
|                   |                  |                               | Forward 2 range | Closed  | Open    |
|                   |                  |                               | Forward 3 range | Open    | Closed  |
|                   |                  |                               | Forward 4 range | Closed  | Closed  |
| Fwd/Rev Rngs (O)  | Auto 2 Rngs (O)  | Auto forward/reverse 2 ranges | Forward 1 range | Open    | Open    |
|                   |                  |                               | Forward 2 range | Open    | Closed  |
|                   |                  |                               | Reverse 1 range | Closed  | Open    |
|                   |                  |                               | Reverse 2 range | Closed  | Closed  |
| Auto 2 Rngs (O)   | Fwd/Rev Rngs (O) |                               | Forward 1 range | Open    | Open    |
|                   |                  |                               | Forward 2 range | Closed  | Open    |
|                   |                  |                               | Reverse 1 range | Open    | Closed  |
|                   |                  |                               | Reverse 2 range | Closed  | Closed  |

\*: “No Function” is the default value. Only DO or DIO is used for single or dual ranges; accordingly, the unused terminal remains at the default value (i.e., No Function) and can therefore be used for other functions.

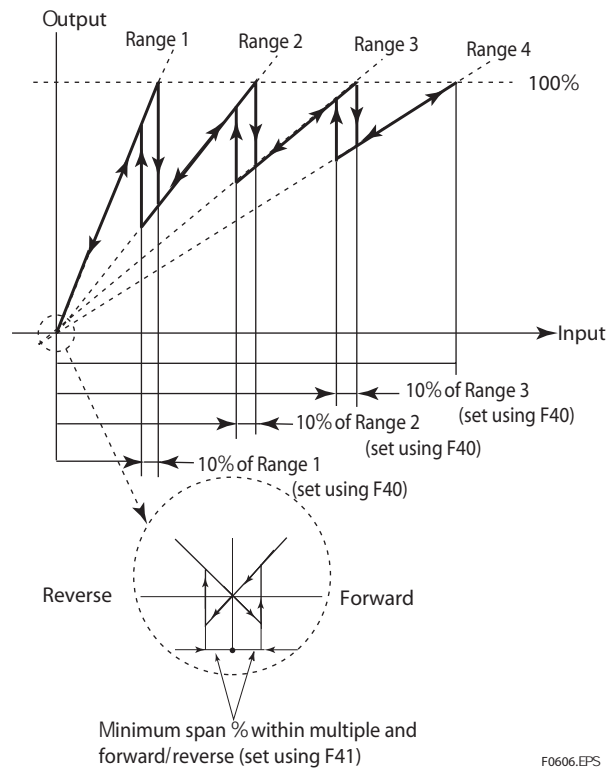
\*: “DIO (O)” indicates DIO function is used for output.

T0627.EPS

### Parameter setting sequence (for automatic multiple ranges switching)



F0605.EPS



F0606.EPS

Figure 6.4.1 Multiple Ranges and Hysteresis Widths



#### NOTE

For more details regarding the setting of hysteresis width, refer to the description of setting parameter for **F40: Auto Range Hys** and **F41: Bi Direction Hys**.

## 6. PARAMETER DESCRIPTION

### Multiple Ranges Setting 2:

#### Multiple ranges switching via external status input

- For both the forward and reverse directions, switching of up to two ranges can be carried out based on a status input; however, switching between directions is not possible. Switching between forward and reverse ranges is carried out automatically only when the flow direction reverses.
- DIO terminal is used for multiple ranges switching. For more details, refer to Table 6.4.2: Multiple Ranges Switching via External Status Input.

### Multiple Ranges Switching via External Status Input

Operations are performed in accordance with the following table when the active mode has been set to "Closed (On) Act" using **F22: DO Active Mode** or "Closed/Short Act" using **F23: DIO Active Mode**. Operating patterns are reversed when the active mode has been set to "Open (Off) Act" using **F22: DO Active Mode** or "Open/Open Act" using **F23: DIO Active Mode**.

**Table 6.4.2 Multiple Ranges Switching via External Status Input**

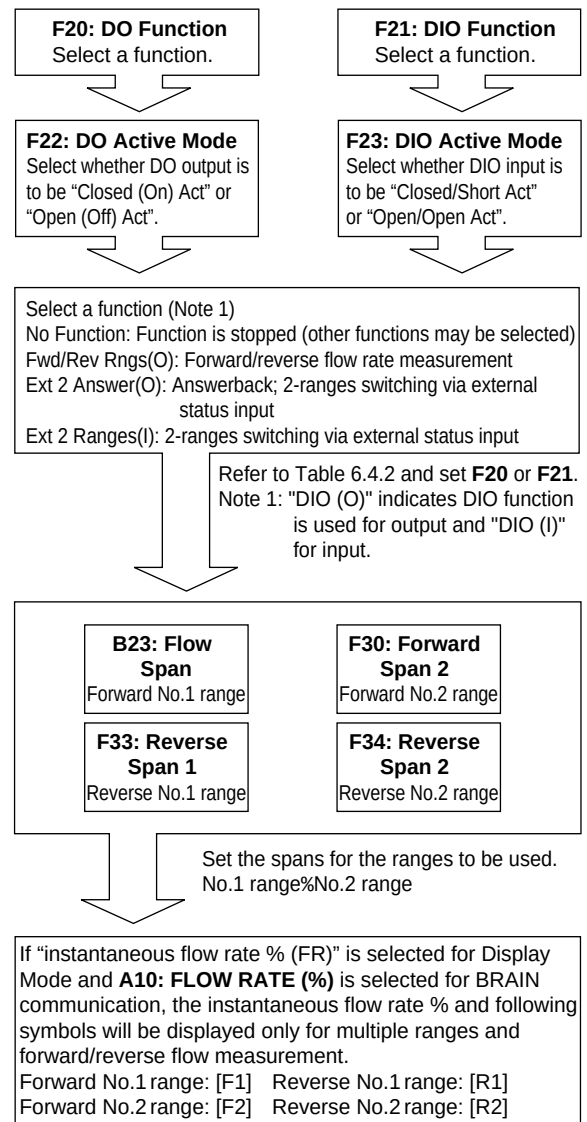
| Parameter setting |                  | Function                                   |                                                                          | Status output                    |                  |                                |
|-------------------|------------------|--------------------------------------------|--------------------------------------------------------------------------|----------------------------------|------------------|--------------------------------|
| F20               | F21              |                                            |                                                                          | DO                               | DIO              |                                |
|                   |                  |                                            |                                                                          | DIO (O)                          | DIO (I)          |                                |
| No Function       | Ext 2 Ranges (I) | External forward 2 ranges, no answerback   | Forward 1 range<br>Forward 2 range                                       | –<br>–                           | –<br>–           | Open<br>Short                  |
| Fwd/Rev Rngs (O)  | Ext 2 Ranges (I) | External forward/reverse 2 ranges          | Forward 1 range<br>Forward 2 range<br>Reverse 1 range<br>Reverse 2 range | Open<br>Open<br>Closed<br>Closed | –<br>–<br>–<br>– | Open<br>Short<br>Open<br>Short |
| Ext 2 Answer (O)  | Ext 2 Ranges (I) | External forward 2 ranges, with answerback | Forward 1 range<br>Forward 2 range                                       | Open<br>Closed                   | –<br>–           | Open<br>Short                  |

\*: "No Function" is the default value. Only DIO is used for dual ranges; accordingly, the unused DO terminal remains at the default value (i.e., No Function) and can therefore be used for other functions.

\*: "DIO (I)" indicates DIO function is used for input.

T0628.EPS

### Parameter setting sequence (for multiple ranges switching via external status input)



F0607.EPS

### [F40: Auto Range Hys] Setting of automatic range-switching hysteresis width

Automatic switching takes place for multiple range switching when 100 % of the range is exceeded, and this parameter allows a hysteresis width to be set for this switching.

Refer to Table 6.4.1: Multiple Ranges and Hysteresis Widths.

### [F41: Bi Direction Hys] Setting of forward/reverse flow measurement hysteresis

This parameter sets the hysteresis for forward/reverse flow-rate measurement as a % value of the minimum flow span.

Refer to Table 6.4.1: Multiple Ranges and Hysteresis Widths.

## 6) Menu G: Alarm Setting items

(Refer to Section 6.5: Alarm Functions for more details.)

Menu G principally contains setting items relevant to alarms.

### [G10: Low Alarm] Low alarm setting

This parameter sets the low limit (L) alarm value, and this is done using a % value of the maximum span.

- A setting value of -110 % indicates that the alarm is disabled.

### [G11: High Alarm] High alarm setting

This parameter sets the high limit (H) alarm value, and this is done using a % value of the maximum span.

- A setting value of 110 % indicates that the alarm is disabled.

### [G12: Low Low Alarm] Low-low alarm setting

This parameter sets the low-low limit (LL) alarm value, and this is done using a % value of the maximum span.

- A setting value of -110 % indicates that the alarm is disabled.

### [G13: High High Alarm] High-high alarm setting

This parameter sets the high-high limit (HH) alarm value, and this is done using a % value of the maximum span.

- A setting value of 110 % indicates that the alarm is disabled.



## NOTE

Setting of -110 % or 110 % results in the corresponding function being disabled; accordingly, settings can be combined to implement only high alarms or low alarms, etc.

## Output Example 1

The high-high alarm (HH) is set to 90 % or more of the flow-rate output; the low-low alarm (LL), to 20 % or less; the high alarm (H), to 80 % or more; and the low alarm (L), to 30 % or less.

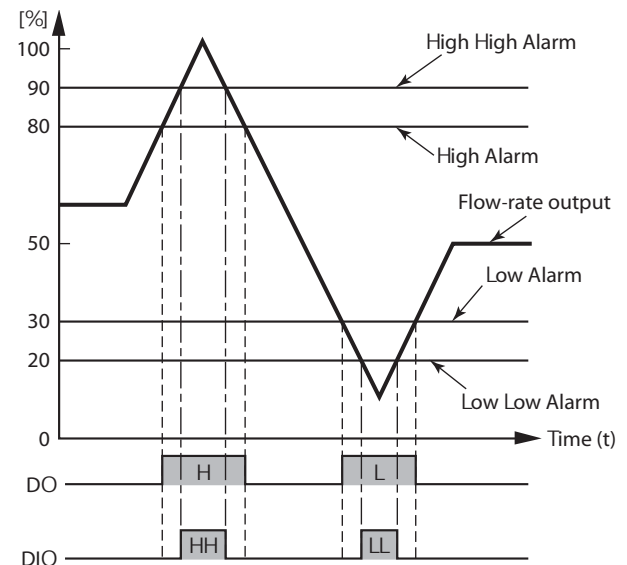
Settings are:

**G10: Low Alarm = 30 %**

**G11: High Alarm = 80 %**

**G12: Low Low Alarm = 20 %**

**G13: High High Alarm = 90 %**



Select "H/L Alarm (O)" with **F20: DO Function**  
 Select "HH/LL Alarm (O)" with **F21: DIO Function**  
 Select "Closed (On) Act" with **F22: DO Active Mode**  
 Select "Closed/Short Act" with **F23: DIO Active Mode**

F0608.EPS

## 6. PARAMETER DESCRIPTION

### Output Example 2

The high alarm (H) is set to 80 % or more of the flow-rate output; the low-low alarm (LL), to 20 % or less.

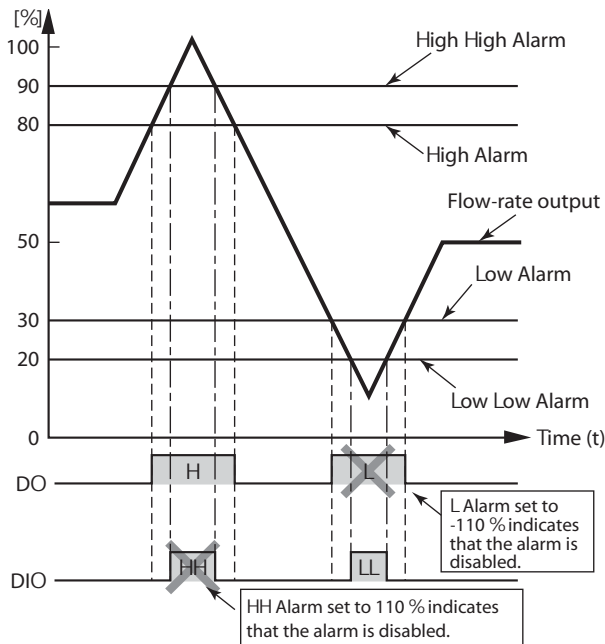
Settings are:

**G10: Low Alarm = -110 %**

**G11: High Alarm = 80 %**

**G12: Low Low Alarm = 20 %**

**G13: High High Alarm = 110 %**



Select "H/L Alarm (O)" with **F20: DO Function**  
 Select "HH/LL Alarm (O)" with **F21: DIO Function**  
 Select "Closed (On) Act" with **F22: DO Active Mode**  
 Select "Closed/Short Act" with **F23: DIO Active Mode**

F0609.EPS

### Output Example 3

The high alarm (H) is set to 80 % or more of the flow-rate output; the high-high alarm (HH), to 90 % or more.

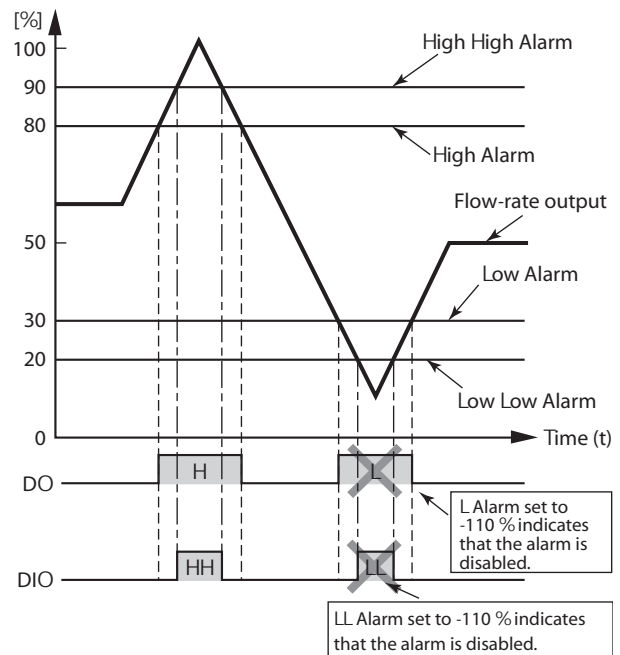
Settings are:

**G10: Low Alarm = -110 %**

**G11: High Alarm = 80 %**

**G12: Low Low Alarm = -110 %**

**G13: High High Alarm = 90 %**



Select "H/L Alarm (O)" with **F20: DO Function**  
 Select "HH/LL Alarm (O)" with **F21: DIO Function**  
 Select "Closed (On) Act" with **F22: DO Active Mode**  
 Select "Closed/Short Act" with **F23: DIO Active Mode**

F0610.EPS



### NOTE

- Although the same items can be selected using the DO terminal (selected with **F20**) and the DIO terminal (selected with **F21**), output is identical for both.
- Setting values of -110 % and 110 % are used to disable corresponding functions; and accordingly, status output can be customized for specific purposes.

**[G14: H/L Alarm Hys]** Setting of upper/lower alarm value hysteresis

This parameter sets the hysteresis width for upper and lower alarm value, using a % value of the maximum span.

### Output Example

The hysteresis width is set to 5 %.

Settings are:

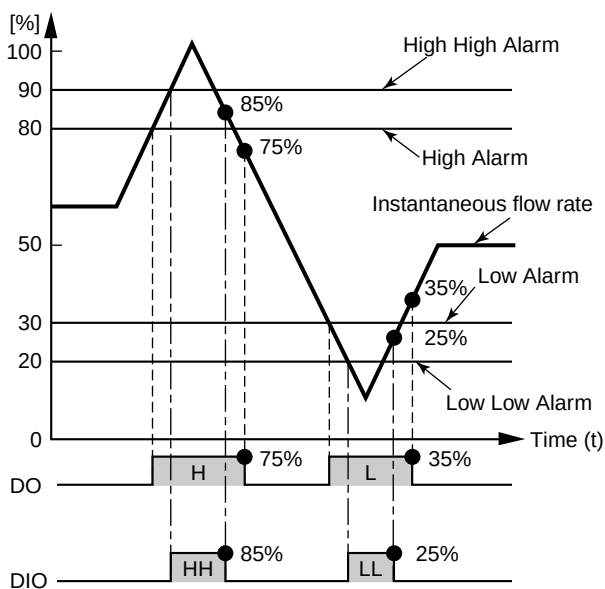
**G10: Low Alarm = 30 %**

**G11: High Alarm = 80 %**

**G12: Low Low Alarm = 20 %**

**G13: High High Alarm = 90 %**

**G14: H/L Alarm Hys = 5 %**



Select "H/L Alarm(O)" for **F20: DO Function**  
 Select "HH/LL Alarm(O)" for **F21: DIO Function**  
 Select "Closed (On) Act" for **F22: DO Active Mode**  
 Select "Closed/Short Act" for **F23: DIO Active Mode**

F0611.EPS

**[G21: 4-20 mA Alarm Out]** Setting of the current output during an alarm occurrence

This parameter can be used to set up the current output during alarm occurrence in advance.

| Setting        | Function                                    |
|----------------|---------------------------------------------|
| 2.4 mA or Less | 2.4 mA or less                              |
| 4.0 mA         | Fixed at 4 mA                               |
| HOLD           | Fixed current value when an alarm occurred. |
| 21.6 or More   | 21.6 mA or more                             |

T0629.EPS

**[G22: 4-20 mA Burn Out]** Display of burnout output

This parameter sets the current output direction for a CPU error (i.e., burnout). Note that communication will not be possible if such an error occurs.

With the standard specification, this is set to High and 25 mA is output when an error occurs. Low is setup for optional specifications (/C1), and in such a case, 0 mA is output for the occurrence of an error.



### NOTE

The current output direction for a CPU failure (i.e., burnout) can be changed. Refer to selection 10.2.1: Setting of Burnout Switch.

**[G30: Alm-Setting]** Setting of "Setting alarm"

This parameter specifies whether the setting alarm will be recognized as an alarm.

| Setting | Function                   |
|---------|----------------------------|
| No      | Not recognized as an alarm |
| Yes     | Recognized as an alarm     |

T0630.EPS

**[G31: Alm-Sig Over]** Setting of "Signal Overflow Alarm"

This parameter specifies whether the signal overflow process alarm will be recognized as an alarm. A signal overflow occurs when there is an error in the input signal.

| Setting | Function                   |
|---------|----------------------------|
| No      | Not recognized as an alarm |
| Yes     | Recognized as an alarm     |

T0631.EPS

**[G32: Alm-Emp Pipe]** Setting of "Empty Pipe Alarm"

This parameter specifies whether the empty pipe (flowtube is not filled with fluid) process alarm will be recognized as an alarm.

| Setting | Function                   |
|---------|----------------------------|
| No      | Not recognized as an alarm |
| Yes     | Recognized as an alarm     |

T0632.EPS

**[G33: Alm-HH/LL]** Setting of "HH/LL Alarm"

(Refer to the descriptions of **G12** and **G13** for more details regarding HH and LL alarms.)

This parameter specifies whether HH/LL alarm process alarm will be recognized as an alarm.

## 6. PARAMETER DESCRIPTION

| Setting | Function                   |
|---------|----------------------------|
| No      | Not recognized as an alarm |
| Yes     | Recognized as an alarm     |

T0633.EPS



### NOTE

To set “HH/LL Alarm” as an alarm, it is necessary to set “HH/LL Alarm (O)” according to **F20: DO Function** or **F21: DIO Function**, and set **G12: Low Low Alarm** or **G13: High High Alarm** as well.

**[G34: Alm-Adhesion]** Setting of “Adhesion Alarm”  
This parameter specifies whether the electrode adhesion alarm will be recognized as an alarm.

| Setting | Function                   |
|---------|----------------------------|
| No      | Not recognized as an alarm |
| Yes     | Recognized as an alarm     |

T0634.EPS



### NOTE

The AXFA14 or the AXF integral flowmeter has three different types of alarm (i.e., system alarms, process alarms, and setting alarms). For setting alarms and process alarms, settings are made with **G30**, **G31**, **G32**, **G33** and **G34** to specify whether these will be recognized as an alarm.

Refer to Section 6.5: Alarm Functions for more details regarding the content of each alarm and the effect of alarm recognition on output.

**[G40: Operation Time]** Display of operation time  
This parameter is used to display the operation time. For example, “1D23:45” indicates an operation time of 1 day, 23 hours, and 45 minutes.

**[G41: Alm Record 1]** Alarm record 1  
This parameter is used to display the most-recent alarm, and the alarms that can be displayed are as follows.

## Alarm Items

| Item                                     | Description                                                                                                                      |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| : 16 space characters (i.e., no display) | No issuing of alarms                                                                                                             |
| 10 : uP Fault                            | Microprocessor (CPU) failure                                                                                                     |
| 11 : EEPROM Fault                        | EEPROM failure                                                                                                                   |
| 12 : A/D(H) Fault                        | A/D converter failure (at high frequency)                                                                                        |
| 13 : A/D(L) Fault                        | A/D converter failure (at low frequency side)                                                                                    |
| 14 : A/D(Z) Fault                        | A/D converter failure (detection of adhesion)                                                                                    |
| 15 : Coil Open                           | Flowtube coil is open-circuit                                                                                                    |
| 16 : EEPROM Dflt                         | EEPROM returns to default values                                                                                                 |
| 18 : Power off                           | Power supply is off.                                                                                                             |
| 19 : Inst Pwr Fail                       | Instantaneous power fail for tens of milliseconds.<br>After this fail is released, outputs reach the previous value immediately. |
| 28 : WDT                                 | The return from excessive instantaneous noise.<br>After the noise is released, output return the normal condition.               |
| 30 : Sig Overflow                        | Input signal error                                                                                                               |
| 31 : Empty Pipe                          | Flowtube is not filled with fluid                                                                                                |
| 33 : Adhesion Alm                        | Insulation adhered to electrode                                                                                                  |

T0635.EPS



### NOTE

Records for “30: Sig Overflow” are kept only when **G31** specifies that this condition is to be recognized as an alarm (i.e., “Yes” is selected).  
Records for “31: Empty Pipe” are kept only when **G32** specifies that this condition is to be recognized as an alarm (i.e., “Yes” is selected).  
Records for “33: Adhesion Alm” are kept only when **G34** specifies that this condition is to be recognized as an alarm (i.e., “Yes” is selected).

**[G42: Alm Record Time 1]** Display time of alarm record 1

This parameter is used to display the operation time at which the alarm indicated by **G41: Alm Record1** was occurred. For example, “1D23:45” indicates that an alarm was triggered at the operation time of 1 day, 23 hours, and 45 minutes.

**[G43: Alm Record 2]** Alarm record 2

This parameter is used to display the second most-recent alarm, and the alarms that can be displayed are the same as those for **G41: Alm Record1**.

**[G44: Alm Record Time 2]** Display time of alarm record 2

This parameter is used to display the operation time at which the alarm indicated by **G43: Alm Record2** was occurred. For example, “1D23:45” indicates that an alarm was triggered at the operation time of 1 day, 23 hours, and 45 minutes.

**[G45: Alm Record 3]** Alarm record 3

This parameter is used to display the third most-recent alarm, and the alarms that can be displayed are the same as those for **G41: Alm Record1**.

**[G46: Alm Record Time 3]** Display time of alarm record 3

This parameter is used to display the operation time at which the alarm indicated by **G45: Alm Record3** was occurred. For example, "1D23:45" indicates that an alarm was triggered at the operation time of 1 day, 23 hours, and 45 minutes.

**[G47: Alm Record 4]** Alarm record 4

This parameter is used to display the fourth most-recent alarm, and the alarms that can be displayed are the same as those for **G41: Alm Record1**.

**[G48: Alm Record Time 4]** Display time of alarm record 4

This parameter is used to display the operation time at which the alarm indicated by **G47: Alm Record4** was occurred. For example, "1D23:45" indicates that an alarm was triggered at the operation time of 1 day, 23 hours, and 45 minutes.

**(7) Menu H: Display Setting items**

Menu H contains setting items relevant to the display unit.

**[H10: Display Select1]** First line of display unit

→ Refer to the description for parameter **B40**

This parameter selects the display content for the display unit's first line.

**[H11: Display Select2]** Second line of display unit

→ Refer to the description for parameter **B41**

This parameter selects the display content for the display unit's second line.

**[H12: Display Select3]** Third line of display unit

→ Refer to the description for parameter **B42**

This parameter selects the display content for the display unit's third line.

**[H20: Display Cycle]** Setting of the display cycle

This parameter sets the cycle for the display unit's display-response speed. Settings should be made in accordance with the measurement environment by, for example, setting a longer display cycle when using the equipment in low temperatures.

**[H30: Language]** Setting of display language

→ Refer to the description for parameter **B10**

This parameter can be used to select the language for use on the display unit.

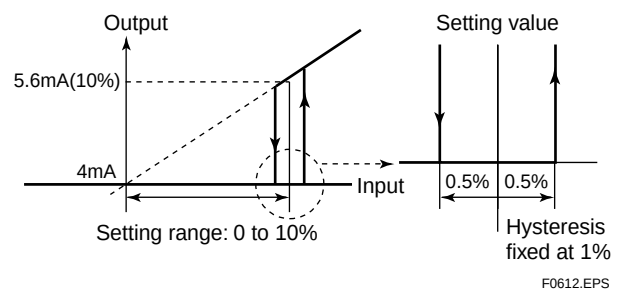
**(8) Menu J: Auxiliary Function Setting items**

Menu J contains setting items such as the flow direction, rate limits, and current output limits.

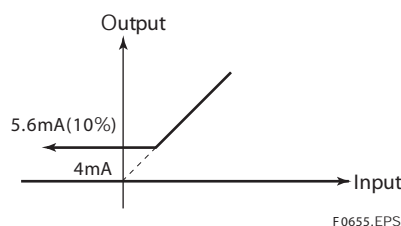
**[J10: 4-20 mA Low Cut]** Setting of the low-cut range for current output

This parameter is used to force current output to 0 % in the vicinity of 0 % output, and setting for the 4-20 mA output low cut is made using a percentage of the smallest span. However, the low cut function will be terminated if this parameter is set to 0 %.

Example: Situation where low cut is set to 10 %

**[J11: 4-20mA Low Lmt]** Setting of the low limit

This parameter is used to restrict low current portions of 4-20 mA output, and it is initially set to -20 %. Setting should be performed when a higher value is required for the lower limit.

**NOTE**

If "2.4 mA or less" has been set for **G21:4-20mA Alarm Out**, 2.4 mA or less will be output upon an alarm occurrence, regardless of the low limit setting.

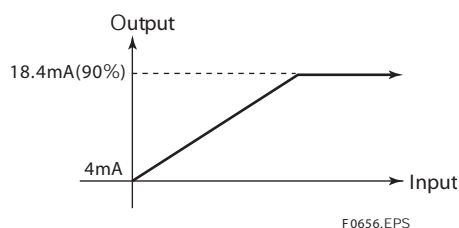
## 6. PARAMETER DESCRIPTION



### NOTE

- If the setting value for the low limit is not less than the high limit value (as set using **J12: 4-20mA High Lmt**), the setting alarm “4-20 Lmt Err” will be displayed.
- This parameter has no effect on pulse output or the totalization function.

**[J12: 4-20 mA High Lmt]** Setting of the high limit  
This parameter is used to restrict high current portions of 4-20 mA output, and it is initially set to 120 %. Setting should be performed when a lower value is required for the higher limit.



### NOTE

If “21.6 mA or more” has been set for **G21:4-20 mA Alarm Out**, 21.6 mA or more will be output upon an alarm occurrence, regardless of the high limit setting.

**[J20: Flow Direction]** Setting of the flow direction  
Upon shipment from the manufacturing plant, the system is setup such that flow in the same direction, as shown by the direction of the arrow mark on the flowtube, will be measured as forward flow; however, this parameter can be used to set “Reverse” so that flow in the opposite direction to the arrow mark will be treated as forward.

Note: This function does not apply to measurement in both the forward and reverse directions. If you like to activate dual direction measurement capability please use “Fwd/Rev Rngs (O)” from either **F20: DO Function** or **F21: DIO Function**.

| Setting | Function                                       |
|---------|------------------------------------------------|
| Forward | Forward direction corresponds with arrow mark. |
| Reverse | Forward direction is opposite to arrow mark.   |

T0638.EPS

**[J21: Rate Limit]** Setting of the rate limit value

- This parameter is used in situations where sudden noise cannot be eliminated by increasing the damping time constant.
- In situations where step signals or sudden noise signals caused by slurry or the like are entered, this parameter is used to set the standard for determining whether an input corresponds to a flow measurement or noise. Specifically, this determination is made using upper and lower rate limits and using the dead time.
- Rate limit values are set using a percentage of the smallest range. The range of deviation per one calculation cycle should be input.

**[J22: Dead Time]** Setting of dead time

This parameter sets the time for application of the rate limit, and if a value of 0 is set, the rate limit function will be terminated.

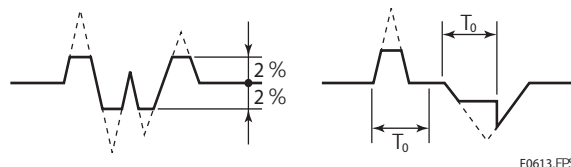


### NOTE

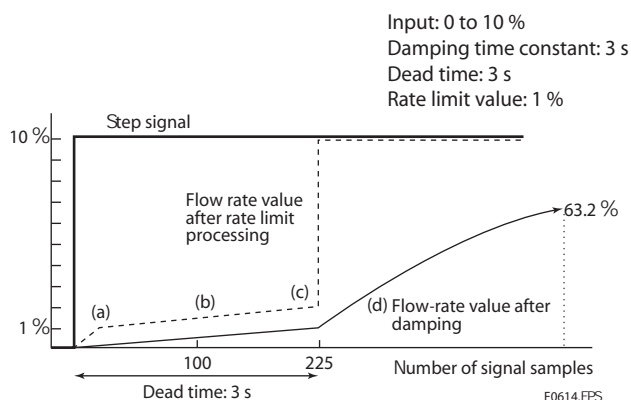
#### Determining rate limit value and dead time

**Rate limit value:**  
Determines the level for output fluctuation cutoff. For example, if this is set to 2 %, noise above and below 2 % will be eliminated as shown in the

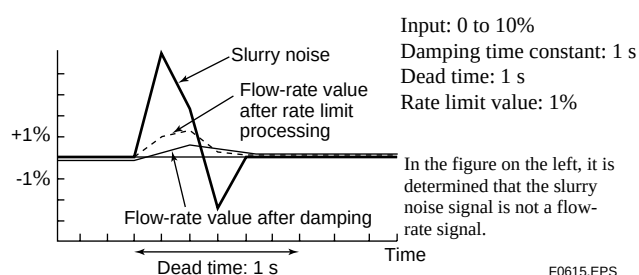
**Dead time ( $T_0$ ):**  
This is to be determined using the output fluctuation width. If noise exceeds the dead time as shown in the diagram below, the dead time should be made longer.



- **Signal processing method:**  
A fixed upper and lower limit value is setup with respect to the primary delay response value for the flow-rate value obtained during the previous sampling, and if the currently sampled flow rate is outside these limits, then the corresponding limit is adopted as the current flow rate value. In addition, if signals which breach the limits in the same direction occur over multiple samples (i.e., within the dead time), it is concluded that the corresponding signal is a flow rate signal.

**Example 1: Step input**

- (1) In comparison with the previous value at (a), it is determined that the signal is in excess of the rate limit value and the response becomes 1%. However, the actual output applies damping, and therefore the output turns out to be as indicated by the dotted line.
- (2) Subsequent flow values within the dead time zone correspond to signals of post-damping flow value + rate limit value (1%).
- (3) Since input signals do not return to within the rate limit value during the dead time, it is determined at (c) that this signal is a flow-rate signal.
- (4) The output signal becomes a damped curve and compliance with the step signal begins.  
Three seconds after determination of a flow-rate signal in the above figure, a level of 63.2 % is reached.

**Example 2: Slurry noise**

**[J23: Pulsing Flow]** Setting of pulsing flow support  
In a situation where pulsating flow causes error in the average flow value, due to the application of a plunger pump, this parameter provides functionality whereby calculation is controlled and variations in flow rate are followed.

| Setting | Function                 |
|---------|--------------------------|
| No      | Normal                   |
| Yes     | Support for pulsing flow |

T0637.EPS

**[J24: T/P Damp Select]** Setting of damping operation

This parameter is used to select the damping function for totalization and pulse output.

| Setting | Function   |
|---------|------------|
| Damp    | Damping    |
| No Damp | No damping |

T0653.EPS

**[J30: Power Synch]** Setting of power synchronization

This parameter indicates whether or not the internal frequency is to be synchronized with that of the power supply.

| Setting | Function         |
|---------|------------------|
| No      | Not synchronized |
| Yes     | Synchronized     |

T0639.EPS

**[J31: Power Frequency]** Setting of power frequency  
When "Yes" (i.e., in synchrony) has been selected for **J30: Power Synch**, this parameter is used to display the power supply frequency. If "No" (i.e., not synchronized) has been selected, the power supply frequency is to be specified.

**IMPORTANT**

In situations where a DC power supply is used for converters, set the local commercial power frequency in area where the converter is installed. Set "No" for **J30: Power Synch** and the local commercial power frequency for **J31: Power Frequency**.

|                 |     |                                          |
|-----------------|-----|------------------------------------------|
|                 |     | Size 2.5 mm (0.1 in.) to 400 mm (16 in.) |
| AC power supply | J30 | Power synchronous (Yes)                  |
|                 | J31 | No setting                               |
| DC power supply | J30 | Power asynchronous (No)                  |
|                 | J31 | Local commercial power frequency         |

T0642-1.EPS

**[J40: Memo 1]** Setting of memo 1

**[J41: Memo 2]** Setting of memo 2

**[J42: Memo 3]** Setting of memo 3

These parameters are used with the memo function, and up to 16 characters can be set for each.

## 6. PARAMETER DESCRIPTION

**[J50: Software Rev No]** Display of software revision

This parameter is used to display the software's revision number.

### (9) Menu K: Diagnostic Function Setting items

Menu K contains items that are relevant to self diagnosis.

**[K10: Adhesion Check]** Setting of adhesion diagnostic function

This parameter selects whether or not the adhesion diagnostic function will be carried out.

| Setting | Function                                   |
|---------|--------------------------------------------|
| No      | Stop the adhesion diagnostic function      |
| Yes     | Carry out the adhesion diagnostic function |

T0640.EPS



#### NOTE

#### Adhesion Diagnostic Function

- This function diagnoses adhesion using electrode resistance values.
- When "Adhesion check" has been set for **B41/H11: Display Select 2** or **B42/H12: Display Select 3** the diagnose adhesion is indicated on the display unit using four different levels.
- If the judgment value for Level 3 is exceeded, a warning is displayed; and if the value for Level 4 is exceeded, an alarm is displayed.
- Available conductivity for this function is limited to:  
Nominal size 10 mm and smaller: 30  $\mu\text{S}/\text{cm}$   
Nominal size 15 mm and larger: 10  $\mu\text{S}/\text{cm}$   
Make sure to use the adhesion diagnostic function with the greater conductivity than the above mentioned value.



F0616.EPS

**[K11: Adhesion Level 1]** Setting 1 for adhesion diagnostic level

This parameter sets the resistance value (in  $\text{M}\Omega$ ) for judgment of Level 1.

**[K12: Adhesion Level 2]** Setting 2 for adhesion diagnostic level

This parameter sets the resistance value (in  $\text{M}\Omega$ ) for judgment of Level 2.

**[K13: Adhesion Level 3]** Setting 3 for adhesion diagnostic level

This parameter sets the resistance value (in  $\text{M}\Omega$ ) for judgment of Level 3.

\*: The warning **80: Adhesion Wng** is displayed when the adhesion level reaches Level 3.

\*: If "Warning Output" has been selected for **F20: DO Function** or **F21: DIO Function**, then status output will be performed when the adhesion level reaches Level 3.

**[K14: Adhesion Level 4]** Setting 4 for adhesion diagnostic level

This parameter sets the resistance value (in  $\text{M}\Omega$ ) for judgment of Level 4.

\*: The process alarm **33: Adhesion Alm** is displayed when the adhesion level reaches Level 4.

\*: Alarm output will be preformed if "Alarm Output" has been selected for **F20: DO Function** or **F21: DIO Function**, and "Yes" for **G34: Alm-Adhesion**.

**[K15: Adh Measure Value]** Displays the adhesion diagnostic measurement

This parameter displays the value measured using the adhesion diagnostic function (in  $\text{M}\Omega$ ).

When "No" is selected for **K10: Adhesion Check**, his parameter displays the indetermination value.

### (10) Menu M: Automatic Zero Adjustment Function Setting items

Menu M contains items that are relevant to automatic adjustment of the zero point.

**[M10: Auto Zero Exe]** Execution of automatic zero adjustment function

→ Refer to the description of parameter **B50**.

**[M11: Magflow Zero]** Results of automatic zero adjustment

This parameter is used to display the results obtained specifically from

**B50/M10: Auto Zero Exe**.

The correction values displayed, and it is also possible to directly enter correction values.

## (11) Menu N: Loop Test (Output Test) Setting items

Menu N contains items that are relevant to loop testing.

**[N10: Test Mode]** Setting for loop test execution

| Setting | Function                      |
|---------|-------------------------------|
| Normal  | No execution of loop testing. |
| Test    | Loop testing is started       |

T0641.EPS



### IMPORTANT

- (1) Test output has priority over flow rate measurement signals. When carrying out flow rate measurements, be sure to always return to "Normal".
- (2) Upon entry to the Test Mode, all output terminals will simultaneously adopt test condition.
- (3) "Normal" will be restored when the power is turned off or when 30 min have elapsed since entry to Test Mode.
- (4) In Test Mode, the warning **83: Fix Cur Wng** will be displayed as a warning message. (For more details, refer to Section 6.5 Alarm Functions.)

**[N11: Test Output Value]** Setting for test output values

During loop testing, current output (4-20 mA), totalization, and pulse will be output in accordance with this parameter's setting, and values can be set when "Test" has been selected for **N10: Test Mode**. With multiple ranges or when performing forward/reverse flow measurements, setting should be done using a percentage of the maximum range.

**[N30: Test DO]** Setting for DO terminal condition during loop testing

This parameter sets the condition of the DO terminal during loop testing. Setting is possible when "Test" has been selected for **N10: Test Mode**.

| Setting     | Function                                       |
|-------------|------------------------------------------------|
| Open (Off)  | DO terminal in Open (Off) condition            |
| Closed (On) | DO terminal in Closed (On) condition           |
| Pulse       | Outputs pulses as were specified with Menu E.* |

T0642.EPS

\*: If the pulse scale is 0 pps or there is a pulse setting error, the DO terminal is "Open (Off)."

**[N31: Test DIO (O)]** Setting for the DIO terminal condition during loop testing

This parameter sets the condition of the DIO terminal during loop testing. Setting is possible when "Test" has been selected for **N10: Test Mode**.

| Setting     | Function                                                                                        |
|-------------|-------------------------------------------------------------------------------------------------|
| Input mode  | Must be set when <b>N32: Test DIO (I)</b> is used to display the condition of the DIO terminal. |
| Open (Off)  | DIO terminal in Open (Off) condition                                                            |
| Closed (On) | DIO terminal in Closed (On) condition                                                           |

T0643.EPS

**[N32: Test DIO (I)]** Display for DIO terminal condition

This parameter is used to display the condition of the DIO terminal. Setting is possible when "Test" has been selected for **N10: Test Mode**.

| Setting | Function                        |
|---------|---------------------------------|
| Open    | DIO terminal in Open condition  |
| Short   | DIO terminal in Short condition |

T0644.EPS

## (12) Menu P: Parameter Protection password items

Menu P contains items that are relevant to write protection and passwords. If user selected password is lost see 6-11 of this manual.

**[P10: Key Code]** Parameter display limit  
This parameter restricts access to the Service Mode.



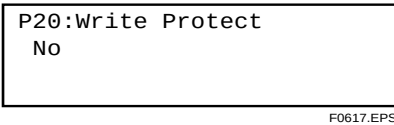
### NOTE

#### Write Protect Function

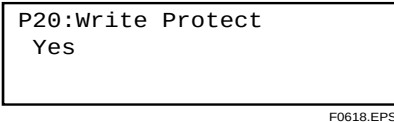
- The parameters **P20** through **P23** are set when using the write protect function. Specifically, this function responds to a hardware switch or the setting of a software password, and it protects parameters from being overwritten.
- If the hardware switch is set to "Protect", it will not be possible to overwrite parameters; furthermore, this condition will be maintained until the switch is set to "Enable".
- For more details regarding hardware switch settings, refer to Section 10.2.2: Setting of Write Protect Switch.

6. PARAMETER DESCRIPTION

**[P20: Write Protect]** Status indication for write protection  
This parameter is used to indicate whether or not write protection is currently on.  
Default setting (Enable)



Write protection (Protect)



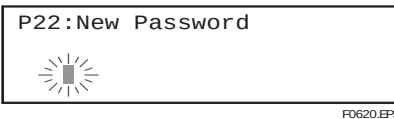
**[P21: Enable Wrt Passwd]** Cancellation of write protect setting and password  
When the correct password is input, write protection will be released for a period of 10 min; furthermore, this period will be extended by a further 10 min each time a parameter is overwritten.



The cursor will flash when entering Parameter Replacement Mode, and the password set with **P22: New Password** should be input at this time.

**[P22: New Password]** Setting of a new password  
This parameter sets the password required for the release of write protection. When set, it will be possible to make write protect settings on the software side.

Default setting



The default setting for this parameter is a string of 8 spaces (i.e., Enable), and thus, the password field will be empty. When the cursor is flashing, the password should be input. Press the SET key twice to confirm the password. The display will then change to "\*\*\*\*\*".

After password setting



To change a password, first of all use the password originally set with **P21: Enable Wrt** to release the write protect function, and then set the new password. Alternatively, if it is desired to return to the condition where no password is set, enter a string of 8 spaces.

**[P23: Software Seal]** Display the software seal  
When the joker password has been used to release write protection, this parameter displays "Break", and when protection is cancelled using the password set using **P22: New Password**, it returns to "Keep".



NOTE

If a user selected password is lost refer to page 6-11 in this manual.

## 6.5 Alarm Functions

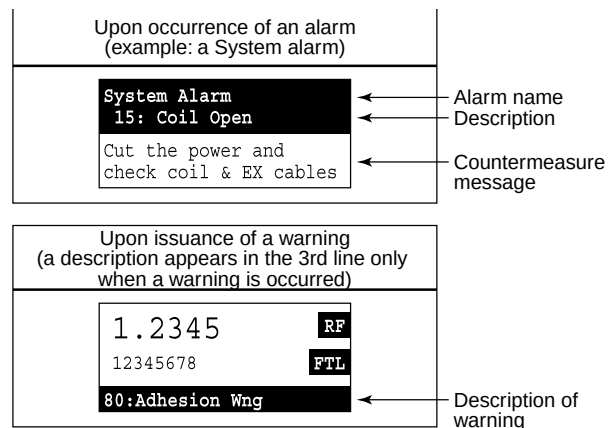
### 6.5.1 Alarm Levels

Alarms are classified into the following four different types based on level.

| Alarm         | Level                        | Description                                                                                                                                                                                |
|---------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System alarm  | Major breakdown              | Device error or inability to obtain correct measurements. Replacement will be required.                                                                                                    |
| Process alarm | Intermediate level breakdown | Device is normal but process-related errors make correct measurement impossible. Maintenance or the like will be required.                                                                 |
| Setting alarm | Minor breakdown              | Device is normal but errors have been made in the setting of parameters. Functions not related to the incorrect settings are operating normally. The incorrect settings must be corrected. |
| Warning       | Warning                      | Device and measurements are normal but a warning is occurred.                                                                                                                              |

T0645.EPS

When an alarm has been occurred, the corresponding name, description, and suitable countermeasure will be displayed on the display unit. The normal Display Mode and Alarm Mode may be displayed alternatively. When a warning has been issued, the corresponding content will be shown in the third line in the Display Mode.



F0622.EPS

### 6.5.2 Alarm Selection

The display and output differs depending on the alarm levels. Certain types of alarm may or may not be recognized as alarms, according to the settings of certain parameters. The parameters that are relevant to this function as follows.

**[F20: DO Function]** Setting of the function for the DO status output terminal

**[F21: DIO Function]** Setting of the function for the DIO status input/output terminal

**[F22: DO Active Mode]** Setting of the active mode for DO terminal

**[F23: DIO Active Mode]** Setting of the active mode for DIO terminal

**[G21: 4-20mA Alarm Out]** Setting of the current output during an alarm occurring.

**[G30: Alm-Setting]** Setting of "Setting Alarm"

**[G31: Alm-Sig Over]** Setting of "Signal Overflow Alarm"

**[G32: Alm-Emp Pipe]** Setting of "Empty Pipe alarm"

**[G33: Alm-HH/LL]** Setting of "HH/LL Alarm" (Refer to the descriptions of **G12** and **G13** for more details regarding HH and LL alarms.)

**[G34: Alm-Adhesion]** Setting of "Adhesion Alarm"

**[G41: Alm Record 1]** Alarm record 1

**[G43: Alm Record 2]** Alarm record 2

**[G45: Alm Record 3]** Alarm record 3

**[G47: Alm Record 4]** Alarm record 4

#### (1) Display and output condition for system alarms

|    |              | Alarm description          | Alarm output | 4-20 mA output        | Totalization    | Pulse   | Display unit                                 | Alarm record    |
|----|--------------|----------------------------|--------------|-----------------------|-----------------|---------|----------------------------------------------|-----------------|
|    | Normal       |                            | Closed (On)  | Normal                | Normal          | Normal  | Display Mode                                 | No              |
| 10 | mP Fault     | Microprocessor(CPU)failure | Open (Off)   | 0mA or 25mA (*)       | Indetermination | Stopped | Indetermination                              | Indetermination |
|    |              |                            |              |                       |                 |         |                                              |                 |
| 11 | EEPROM Fault | EEPROM failure             | Open (Off)   | Fixed (G21 selection) | Stopped         | Stopped | Alarm Mode (display of system alarm message) | Recorded        |
| 12 | A/D(H) Fault |                            |              |                       |                 |         |                                              |                 |
| 13 | A/D(L) Fault | A/D converter failure      |              |                       |                 |         |                                              |                 |
| 14 | A/D(Z) Fault |                            |              |                       |                 |         |                                              |                 |
| 15 | Coil Open    |                            |              |                       |                 |         |                                              |                 |
| 16 | EEPROM Dflt  | EEPROM default values      |              |                       |                 |         |                                              |                 |

Note: • Alarm is output only when F20: DO Function or F21: DIO Function is set to "Alarm Output."

• The operation when "Open (Off) Act" is set for F22: DO Active Mode, or "Open/Open Act" is set for F23: DIO Active Mode is shown in above table.

• 4-20mA output upon the occurrence of an alarm will be fixed at the value selected with G21: 4-20mA Alarm Out.

\*The output value is performed in accordance with the setting of the burnout switch. For information about this switch, see Section 10.2.1.

T0646.EPS

#### (2) Display and output condition for process alarms

|    |              | Alarm description                 | Selection (parameter number) | Alarm output | 4-20 mA output   | Totalization     | Pulse output     | Display unit         | Alarm record |
|----|--------------|-----------------------------------|------------------------------|--------------|------------------|------------------|------------------|----------------------|--------------|
| 30 | Sig Overflow | Input signal error                | YES (G31)                    | Open (Off)   | Fixed            | Stopped          | Stopped          | Alarm Mode (Message) | Recorded     |
|    |              |                                   | NO (G31)                     | Closed (On)  | Continuous (*)   | Continuous (*)   | Continuous (*)   | Display Mode         | No           |
| 31 | Empty Pipe   | Flowtube is not filled with fluid | YES (G32)                    | Open (Off)   | Fixed            | Stopped          | Stopped          | Alarm Mode (Message) | Recorded     |
|    |              |                                   | NO (G32)                     | Closed (On)  | Continuous (*)   | Continuous (*)   | Continuous (*)   | Display Mode         | No           |
| 32 | HH/LL Alm    | HH/LL Alarm                       | YES (G33)                    | Open (Off)   | Normal operation | Normal operation | Normal operation | Alarm Mode (Message) | No           |
|    |              |                                   | NO (G33)                     | Closed (On)  |                  |                  |                  | Display Mode         |              |
| 33 | Adhesion Alm | Electrode adhesion alarm          | YES (G34)                    | Open (Off)   | Fixed            | Stopped          | Stopped          | Alarm Mode (Message) | Recorded     |
|    |              |                                   | NO (G34)                     | Closed (On)  | Continuous (*)   | Continuous (*)   | Continuous (*)   | Display Mode         | No           |

(3)

Note: • Alarm is output only when F20: DO Function or F21: DIO Function is set to "Alarm Output."

• The operation when "Open (Off) Act" is set for F22: DO Active Mode or "Open/Open Act" is set for F23: DIO Active Mode is shown in above table.

• 4-20 mA output upon the occurrence of an alarm will be fixed at the value selected with G21: 4-20mA Alarm Out.

\*: Although outputs are continuous, output values are not guaranteed.

T0647.EPS

## 6. PARAMETER DESCRIPTION

### (3) Display and output condition for setting alarm occurrences

|    |                                           | Alarm description                                                                                                                                                               | Selection (parameter number) | Alarm output | 4-20 mA output   | Totalization     | Pulse output     | Display unit         | Alarm record |
|----|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------|------------------|------------------|------------------|----------------------|--------------|
| 50 | Span > 10m/s                              | Span flow velocity setting is 11 m/s or more                                                                                                                                    | NO (G30)                     | Closed (On)  | Fixed            | Stopped          | Stopped          | Alarm Mode (message) | No           |
| 51 | Span < 0.1m/s                             | Span flow velocity setting is 0.05 m/s or less                                                                                                                                  |                              |              |                  |                  |                  |                      |              |
| 52 | TTL > 10000p/s                            | Totalization rate is 11000 pps or more                                                                                                                                          |                              | Closed (On)  | Normal operation | Stopped          | Normal operation | Alarm Mode (message) | No           |
| 53 | TTL < 0.0001p/s                           | Totalization rate is 0.00005 pps or more                                                                                                                                        |                              |              |                  |                  |                  |                      |              |
| 54 | 4-20 Lmt Err                              | The condition [4-20 low limit (J11) < 4-20 high limit (J12)] is not satisfied.                                                                                                  |                              | Closed (On)  | Fixed            | Normal operation | Normal operation | Alarm Mode (message) | No           |
| 55 | Multi Rng Err                             | The condition [No. 1 range < No. 2 range < No. 3 range < No. 4 range] is not satisfied for multiple ranges.                                                                     |                              | Closed (On)  | Fixed            | Stopped          | Stopped          | Alarm Mode (message) | No           |
| 56 | H/L HH/LL Set                             | The condition [High Alarm (G11) – Low Alarm (G10) > H/L Alarm Hys (G14)] or the condition [High High Alarm (G13) – Low Low Alarm (G12) > H/L Alarm Hys (G14)] is not satisfied. |                              | Closed (On)  | Normal operation | Normal operation | Normal operation | Alarm Mode (message) | No           |
| 57 | Dens Set Err                              | Mass units have been selected for Base Flow Unit (C40) but density is set to 0.                                                                                                 |                              | Closed (On)  | Fixed            | Stopped          | Stopped          | Alarm Mode (message) | No           |
| 60 | PLS > 10000p/s                            | Pulse rate is 11000 pps or more with 50% duty.<br>Pulse rate is 10000 pps or more with 0.05 ms selection.                                                                       |                              |              |                  |                  |                  |                      |              |
| 61 | PLS > 5000p/s                             | Pulse rate is 5000 pps or more with 0.1 ms selection.                                                                                                                           |                              |              |                  |                  |                  |                      |              |
| 62 | PLS > 1000p/s                             | Pulse rate is 1000 pps or more with 0.5 ms selection.                                                                                                                           |                              |              |                  |                  |                  |                      |              |
| 63 | PLS > 500p/s                              | Pulse rate is 500 pps or more with 1 ms selection.                                                                                                                              |                              | Closed (On)  | Normal operation | Normal operation | Stopped          | Alarm Mode (message) | No           |
| 64 | PLS > 25p/s                               | Pulse rate is 25 pps or more with 20 ms selection.                                                                                                                              |                              |              |                  |                  |                  |                      |              |
| 65 | PLS > 15p/s                               | Pulse rate is 15 pps or more with 33 ms selection.                                                                                                                              |                              |              |                  |                  |                  |                      |              |
| 66 | PLS > 10p/s                               | Pulse rate is 10 pps or more with 50 ms selection.                                                                                                                              |                              |              |                  |                  |                  |                      |              |
| 67 | PLS > 5p/s                                | Pulse rate is 5 pps or more with 100 ms selection.                                                                                                                              |                              |              |                  |                  |                  |                      |              |
| 68 | PLS < 0.0001p/s                           | Pulse rate is 0.00005 pps or less.                                                                                                                                              |                              |              |                  |                  |                  |                      |              |
| 71 | Meas Mod Set                              | Measure Mode (C20) is set to Enhanced DF without selecting an optional specification code /HF1 or /HF2.                                                                         |                              | Closed (On)  | Fixed            | Stopped          | Stopped          | Alarm Mode (message) | No           |
| 72 | Size Set Err                              | A value of 3000.1 mm or more is set for Nominal Size (C32).                                                                                                                     |                              | Closed (On)  | Fixed            | Stopped          | Stopped          | Alarm Mode (message) | No           |
| 73 | Adh Set Err                               | The condition [Level:1 < Level:2 < Level:3 < Level:4] is not satisfied for adhesion diagnostic level.                                                                           |                              | Closed (On)  | Normal operation | Normal operation | Normal operation | Alarm Mode (message) | No           |
|    | Occurring of any alarm from 50 through 73 | –                                                                                                                                                                               | YES (G30)                    | Open (Off)   | Fixed            | Stopped          | Stopped          | Alarm Mode (message) | No           |

Note: • Alarm is output only when F20: DO Function or F21: DIO Function is set to "Alarm Output."

- The operation when "Open (Off) Act" is set for F22: DO Active Mode or "Open/Open Act" is set for F23: DIO Active Mode is shown in above table.
- 4-20 mA output upon the occurrence of an alarm will be fixed at the value selected with G21: 4-20mA Alarm Out.

T0648.EPS

### 6.5.3 Alarms & Warning Messages

| System Alarms (Device error or inability to obtain correct measurements.) |                                              |                              |                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------|----------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display unit/BRAIN ( ■60) content                                         | Alarm countermeasure message on display unit | Alarm description            | Countermeasure                                                                                                                                                                                                                                                                                           |
| 10:uP Fault                                                               | Contact nearest office or service center     | Microprocessor (CPU) failure | Contact your nearest Yokogawa office or service center.                                                                                                                                                                                                                                                  |
| 11:EEPROM Fault                                                           | Contact nearest office or service center     | EEPROM failure               |                                                                                                                                                                                                                                                                                                          |
| 12:A/D(H) Fault                                                           | Contact nearest office or service center     | A/D converter failure        |                                                                                                                                                                                                                                                                                                          |
| 13:A/D(L) Fault                                                           | Contact nearest office or service center     |                              |                                                                                                                                                                                                                                                                                                          |
| 14:A/D(Z) Fault                                                           | Contact nearest office or service center     |                              |                                                                                                                                                                                                                                                                                                          |
| 15:Coil Open                                                              | Cut the power and check coil & EX cable      | Flowtube coil open-circuit   | Turn off the AXFA14 power supply and examine the excitation cable for breakage. If there is no breakage, contact your nearest Yokogawa office or service center. In case of the AXF integral flowmeter, the excitation cable cannot be examined. Contact your nearest Yokogawa office or service center. |
| 16:EEPROM Dflt                                                            | Contact nearest office or service center     | EEPROM default values        | Contact your nearest Yokogawa office or service center.                                                                                                                                                                                                                                                  |

T0649.EPS

| Process Alarms (Device is normal but process-related errors make correct measurement impossible.) |                                              |                                                                                          |                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display unit/BRAIN (■60) content                                                                  | Alarm countermeasure message on display unit | Alarm description                                                                        | Countermeasure                                                                                                                                                                                                                                                                                             |
| 30:Sig Overflow                                                                                   | Check signal cable and grounding             | Input signal error                                                                       | Carry out an investigation as follows:<br><ul style="list-style-type: none"> <li>• Check the signal cable for breakage.</li> <li>• Check for contact between signal cable, power cable, and excitation cable.</li> <li>• Check for stray currents in the fluid.</li> <li>• Check the grounding.</li> </ul> |
| 31:Empty Pipe                                                                                     | Fill flow tube with fluid                    | Flowtube is not filled with fluid                                                        | Fill the flowtube with fluid.                                                                                                                                                                                                                                                                              |
| 32:HH/LL Alm                                                                                      | Check the flow rate and setting value        | Flow rate alarm for greater than High-High limit value or less than Low-Low limit value. | Check the flow rate and setting value of High High limit and Low Low limit.                                                                                                                                                                                                                                |
| 33:Adhesion Alm                                                                                   | Clean electrodes                             | Electrode adhesion alarm                                                                 | Clean the electrodes.                                                                                                                                                                                                                                                                                      |

T0650.EPS

## 6. PARAMETER DESCRIPTION

| Setting Alarms (Device is normal but errors have been made in the setting of parameters.) |                                              |                                                                                                                                                                                 |                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display unit/BRAIN (■60) content                                                          | Alarm countermeasure message on display unit | Alarm description                                                                                                                                                               | Countermeasure                                                                                                                                                                                       |
| 50:Span > 10m/s                                                                           | Check parameter C40, C41, and C42            | Span flow velocity setting is 11 m/s or more                                                                                                                                    | Check whether parameters C40, C41, and C42 are correct. In case that multiple range or forward and reverse flow measurement functions is used, check whether parameters F30 through F34 are correct. |
| 51:Span < 0.1m/s                                                                          | Check parameter C40, C41, and C42            | Span flow velocity setting is 0.05 m/s or less                                                                                                                                  |                                                                                                                                                                                                      |
| 52:TTL>10000p/s                                                                           | Check parameter D10 and D11                  | Totalization rate is 11000 pps or more                                                                                                                                          | Check whether parameters D10 and D11 are correct.                                                                                                                                                    |
| 53:TTL<0.0001p/s                                                                          | Check parameter D10 and D11                  | Totalization rate is 0.00005 pps or less                                                                                                                                        |                                                                                                                                                                                                      |
| 54:4-20 Lmt Err                                                                           | Check parameter J11 and J12                  | The condition [4-20 low limit (J11) < 4-20 high limit (J12)] is not satisfied.                                                                                                  | Check whether parameters J11 and J12 are correct.                                                                                                                                                    |
| 55:Multi Rng Err                                                                          | Check parameter F30 to F34                   | The condition [No. 1 range < No. 2 range < No. 3 range < No. 4 range] is not satisfied for multiple ranges.                                                                     | Check whether parameters F30 through F34 are correct.                                                                                                                                                |
| 56:H/L HH/LL Set                                                                          | Check parameter G10 to G14                   | The condition [High Alarm (G11) – Low Alarm (G10) > H/L Alarm Hys (G14)] or the condition [High High Alarm (G13) – Low Low Alarm (G12) > H/L Alarm Hys (G14)] is not satisfied. | Check whether parameters G10 through G14 are correct.                                                                                                                                                |
| 57:Dens Set Err                                                                           | Check parameter C40, C45, and C46            | Mass units have been selected for Base Flow Unit (C40) but density is set to 0.                                                                                                 | Check whether parameters C40, C45, and C46 are correct.                                                                                                                                              |
| 60:PLS > 10000p/s                                                                         | Check parameter E10, E11, and E12            | Pulse rate is 11000 pps or more with 50% duty selection.<br>Pulse rate is 10000 pps or more with 0.05 ms selection.                                                             | Check whether parameters E10, E11, and E12 are correct.                                                                                                                                              |
| 61:PLS > 5000p/s                                                                          | Check parameter E10, E11, and E12            | Pulse rate is 5000 pps or more with 0.1 ms selection.                                                                                                                           |                                                                                                                                                                                                      |
| 62:PLS > 1000p/s                                                                          | Check parameter E10, E11, and E12            | Pulse rate is 1000 pps or more with 0.5 ms selection.                                                                                                                           |                                                                                                                                                                                                      |
| 63:PLS > 500p/s                                                                           | Check parameter E10, E11, and E12            | Pulse rate is 500 pps or more with 1 ms selection.                                                                                                                              |                                                                                                                                                                                                      |
| 64:PLS > 25p/s                                                                            | Check parameter E10, E11, and E12            | Pulse rate is 25 pps or more with 20 ms selection.                                                                                                                              |                                                                                                                                                                                                      |
| 65:PLS > 15p/s                                                                            | Check parameter E10, E11, and E12            | Pulse rate is 15 pps or more with 33 ms selection.                                                                                                                              |                                                                                                                                                                                                      |
| 66:PLS > 10p/s                                                                            | Check parameter E10, E11, and E12            | Pulse rate is 10 pps or more with 50 ms selection.                                                                                                                              |                                                                                                                                                                                                      |
| 67:PLS > 5p/s                                                                             | Check parameter E10, E11, and E12            | Pulse rate is 5 pps or more with 100 ms selection.                                                                                                                              |                                                                                                                                                                                                      |
| 70:PLS<0.0001p/s                                                                          | Check parameter E10, E11, and E12            | Pulse rate is 0.00005 pps or less.                                                                                                                                              |                                                                                                                                                                                                      |
| 71:Meas Mod Set                                                                           | Check parameter C20                          | Measure Mode (C20) is set to Enhanced DF without selecting an optional code HF1 or HF2.                                                                                         | Check whether parameter C20 is correct.                                                                                                                                                              |
| 72: Size Set Err                                                                          | Check parameter C32                          | A value of 3000.1 mm or more is set for Nominal Size (C32).                                                                                                                     | Check whether parameter C32 is correct.                                                                                                                                                              |
| 73: Adh Set Err                                                                           | Check parameter K11 to K14                   | The condition in Adhesion detection level, Level:1<Level:2<Level:3<Level:4 is not satisfied.                                                                                    | Check whether parameters K11, K12, K13 and K14 are correct.                                                                                                                                          |

T0651.EPS

| Setting Alarms (Device and measurements are normal but a warning is issued.) |                                              |                                                                        |                                                                                                                                                                              |
|------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display unit/BRAIN (■60) content                                             | Alarm countermeasure message on display unit | Alarm description                                                      | Countermeasure                                                                                                                                                               |
| 80:Adhesion Wng                                                              | —                                            | Slight adhesion to electrodes.                                         | Clean and check the electrodes. Refer to parameter K13.                                                                                                                      |
| 82:Auto Zero Wng                                                             | —                                            | Results of automatic zero adjustment are higher than the rated values. | Carry out adjustment as follows:<br>• Check if the flowtube is filled with fluid.<br>• Check if the flow velocity is completely zero.<br>• Check the condition of grounding. |
| 83:Fix Cur Wng                                                               | —                                            | The current value is fixed.                                            | Confirm whether the flow rate is in excess of the upper limit (108 %) or below the lower limit (-8 %), or whether upon entry to the Test Mode or not.                        |
| 84:Disp Over Wng (only for display unit)                                     | —                                            | Overflow in the display digits during instantaneous flow rate display. | Check whether parameter C43 is correct.                                                                                                                                      |
| 90:Disp SW Wng (only for display unit)                                       | —                                            | Display unit switches are not operating.                               | Investigate whether the display unit cover is fitted or whether the cover's glass surface is dirty.                                                                          |

T0652.EPS

## 6.6 Precautions for the AXF Integral Flow-meter

Although the AXF integral flowmeter's software configurations are the same as the AXFA14, care must be taken in setting the following parameters:

**[C31: Nominal Size Unit]** Setting of the nominal size units

**[C32: Nominal Size]** Setting of the nominal size

**[C21: Low MF]** Setting of the low-frequency meter factor

**[C22: High MF]** Setting of the high-frequency meter factor

**[C23: Low MF (EDF)]** Setting of the low-frequency meter factor for enhanced DF (i.e., enhanced dual frequency excitation)

**[C24: High MF (EDF)]** Setting of the high-frequency meter factor for enhanced DF (i.e., enhanced dual frequency excitation)



### NOTE

The nominal size unit, nominal size and meter factor have been properly set upon shipment from the manufacturing plant. If you still have the original configuration please do not change these parameters.



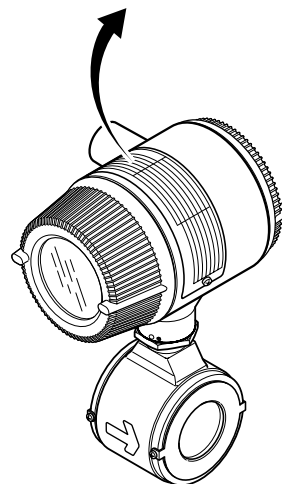
### NOTE

#### Setting the meter factor

Meter factor for the AXF integral flowmeter

|                    |            |             |          |          |                        |    |
|--------------------|------------|-------------|----------|----------|------------------------|----|
| MAGNETIC FLOWMETER |            | STYLE       | mm       | SUPPLY   | VDC $\pm$ 12W          | CE |
| MODEL              | SIZE       | METER       | H        | OUTPUT   | VAC - 50/60Hz 30VA 12W |    |
| SUFFIX             | FACTOR     | FLUID PRWSS | MPa MAX. | NO.      | VDC 0.2A MAX.          |    |
|                    | FLUID TEMP | °C          |          | TAG, NO. |                        |    |
|                    | AMB. TEMP. | °C          |          |          |                        |    |

YOKOGAWA ♦ Made in



F0623.EPS

- (1) Confirm that the meter factor indicated on your AXF integral flowmeter's data plate has been set to the parameters.
- (2) The meter factors are crucial in ensuring that the electromotive force is correctly in proportion to the flow velocity and are determined at the manufacturing plant by actual-flow calibration.



### NOTE

For the hardware configuration of the AXF integral flowmeter, see the user's manual of the AXF Integral Flowmeter [Hardware Edition] (IM 01R20D01-01E-E).

6. PARAMETER DESCRIPTION

# 7. OPERATION VIA BRAIN TERMINAL (BT200)



## NOTE

This chapter describes the AXFA14 converter as an example. The same attention must be paid to the AXF integral flowmeter.

## 7.1 BT200 Basic Operations

### 7.1.1 Key Layout and Display

LCD  
(21 characters × 8 lines)

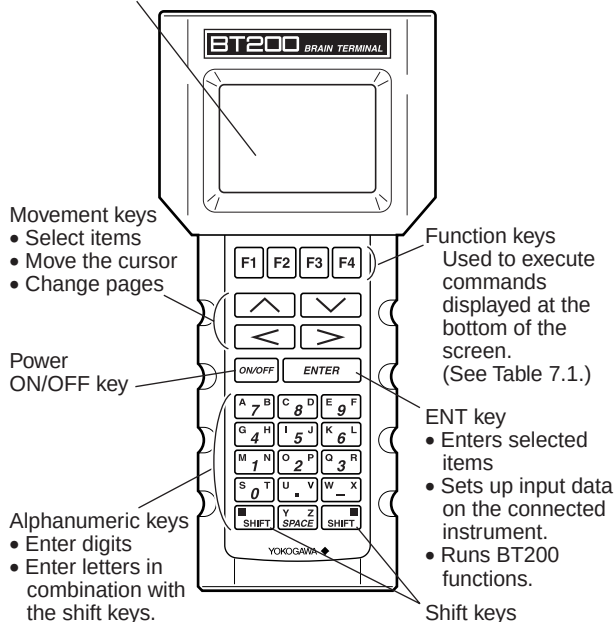
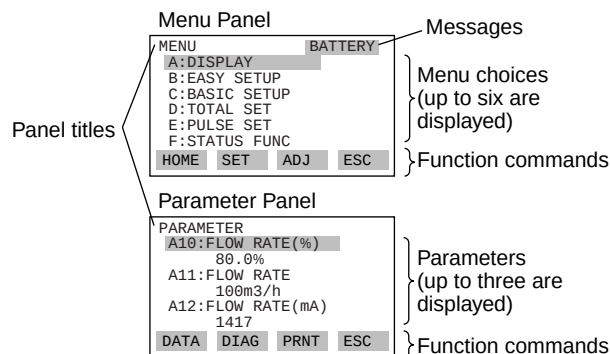


Figure 7.1 Key Layout

If **BATTERY** is displayed on the screen, it indicates that the battery voltage has dropped.

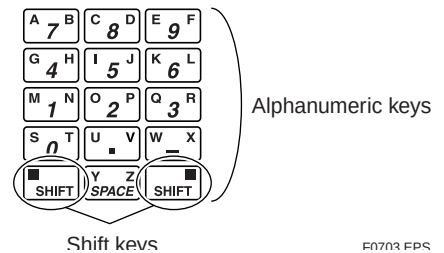


F0702.EPS

### 7.1.2 Key Descriptions

#### (1) Alphanumeric keys and shift keys

You can use the alphanumeric keys in conjunction with the shift keys to enter letters, numbers, and symbols.



F0703.EPS

#### a) Entering numbers, symbols, and spaces [i.e., 0-9, period (.), hyphen (-), underscore (\_)]

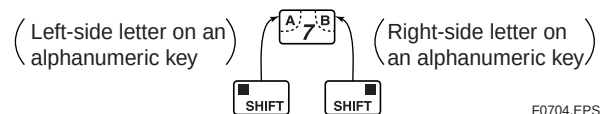
Simply press the required alphanumeric key.

| Entry | Key-in sequence   |
|-------|-------------------|
| -4    | [W X] [G H]       |
| 0.3   | [S T] [U V] [Q R] |

T0701.EPS

#### b) Entering letters (i.e., A-Z)

Press a shift key followed by an alphanumeric key to enter the letter shown on the same side as the shift key. The shift key must be pressed for each letter being input.



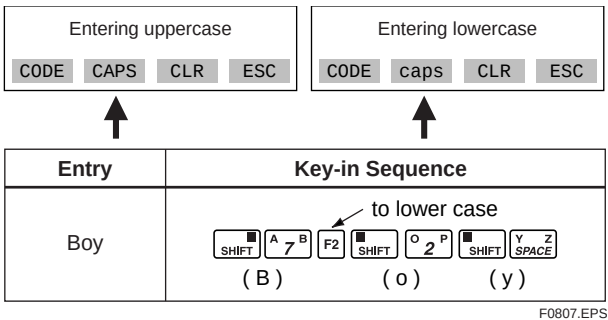
F0704.EPS

| Entry | Key-in sequence                   |
|-------|-----------------------------------|
| W     | [SHIFT] [W X]                     |
| IC    | [SHIFT] [I J] [SHIFT] [C D]       |
| J. B  | [SHIFT] [I J] [U V] [SHIFT] [A B] |

T0702.EPS

7. OPERATION VIA BRAIN TERMINAL (BT200)

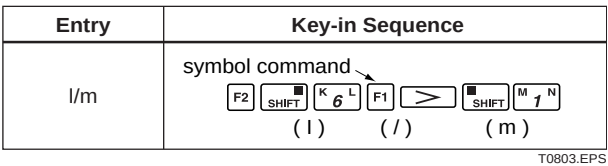
Use the function key [F2] **CAPS** to select between uppercase and lowercase (for letters only). The case toggles between uppercase and lowercase each time you press [F2] **CAPS**.



Use the function key [F1] **CODE** to enter symbols. The following symbols will appear in sequence, one at a time, at the cursor each time you press [F1] **CODE**:

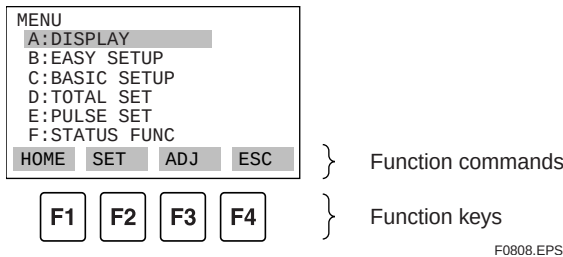
/ . - , + \* ) ( ' & % \$ # " !

To enter characters next to these symbols, press [ > ] to move the cursor.



(2) Function Keys

The functions of the function keys depend on the function commands on display.



Function Command List

| Command   | Function                                        |
|-----------|-------------------------------------------------|
| ADJ       | Displays the ADJ menu                           |
| CAPS/caps | Selects uppercase or lowercase                  |
| CODE      | Selects symbols                                 |
| CLR       | Erases input data or deletes all data           |
| DATA      | Updates parameter data                          |
| DEL       | Deletes one character                           |
| DIAG      | Calls the self-check panel                      |
| ESC       | Returns to the most recent display              |
| HOME      | Displays the menu panel                         |
| NO        | Quits setup and returns to the previous display |
| OK        | Proceeds to the next panel                      |
| PARM      | Enters the parameter number setup mode          |
| SET       | Displays the SET menu                           |
| SLOT      | Returns to the slot selection panel             |
| UTIL      | Calls the utility panel                         |
| *COPY     | Prints out parameters on display                |
| *FEED     | Paper feed                                      |
| *LIST     | Lists all parameters in the menu                |
| *PON/POFF | Automatic printout mode on or off               |
| *PRNT     | Changes to the print mode                       |
| *GO       | Starts printing                                 |
| *STOP     | Cancels printing                                |

\* Available on BT200-P00 (with printer).

## 7.2 AXFA14 Operation Using a BT200

This section describes procedures for setting parameters using a BRAIN Terminal (BT200). For more details regarding AXFA14 functions, refer to Chapter 6: Parameter Description; and for more details regarding BT200 operation methods, refer to the BT200 User's Manual (IM IC0A11-01E).

### 7.2.1 BT200 Connection

#### Connection to the 4-20 mA DC signal line

Communication data is superimposed onto 4-20 mA DC analog signals and transmitted.

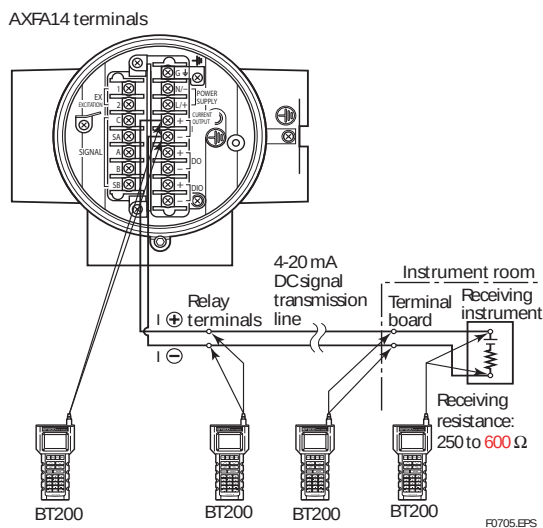


Figure 7.2 BT200's 4-20 mA DC Signal Transmission Line



#### IMPORTANT

Restrictions exist with regard to the distance over which communication is possible. (See Chapter 11)



#### IMPORTANT

If the power of the flowmeter is turned off within 30 s after settings have been made, these settings will be canceled. Accordingly, please ensure that the power remains on for at least 30 s after making settings.



#### IMPORTANT

After approximately 5 min of inactivity, the Auto Power-Off function will operate to turn your BT200 off.



#### IMPORTANT

Be sure to set parameters as "Protect" on the write protect function after the finish of parameter setting. Refer to the "Menu P: Parameter Protection Items" and section "10.2.2" in detail.



#### NOTE

In case of BT200, the parameters are displayed in English only.

Even if the language with the exception of English is selected at **B10/H30: Language**, the parameters are displayed in English upon BT200.

### 7.2.2 The data update and upload/download function of BT200

#### (1) The data update of BT200

When the following parameters are displayed, the measured data is updated automatically every seven seconds.

| Item | Name (BRAIN)  | Item | Name (BRAIN) |
|------|---------------|------|--------------|
| A10  | FLOW RATE (%) | G42  | ALM TIME 1   |
| A20  | FLOW RATE     | G43  | ALM RECORD2  |
| A21  | FLW RATE (mA) | G44  | ALM TIME 2   |
| A30  | TOTAL         | G45  | ALM RECORD3  |
| A31  | REV TOTAL     | G46  | ALM TIME 3   |
| A32  | DIF TOTAL     | G47  | ALM RECORD4  |
| C44  | VELOCITY CHK  | G48  | ALM TIME 4   |
| G22  | 4-20 BURNOUT  | N32  | TEST DIO (I) |
| G40  | OPERATE TIME  | P20  | W PROTECT    |
| G41  | ALM RECORD1   | P23  | SOFT SEAL    |

T0704.EPS

#### (2) Upload/download function of BT200

Upload function is used when the parameters of one AXFA14 are copied to the BT200. And download function is used when the parameters copied to the BT200 are set to another AXFA14. For details, refer to BT200 User's Manual (IM 1C0A11-01E).

The targeted parameters for upload and download are following.

| Item    | Name (BRAIN) | Item    | Name (BRAIN) |
|---------|--------------|---------|--------------|
| C11/B20 | FLOW DAMPING | D10/B30 | TOTAL UNIT   |
| C31     | SIZE UNIT    | D11/B31 | TOTAL SCALE  |
| C32     | NOMINAL SIZE | E10/B32 | PULSE UNIT   |
| C40/B21 | FLOW UNIT    | E11/B33 | PULSE SCALE  |
| C41/B22 | TIME UNIT    | H10/B40 | DISP SELECT1 |
| C42/B23 | FLOW SPAN    | H11/B41 | DISP SELECT2 |
| C43/B24 | FLOW DECIMAL | H12/B42 | DISP SELECT3 |

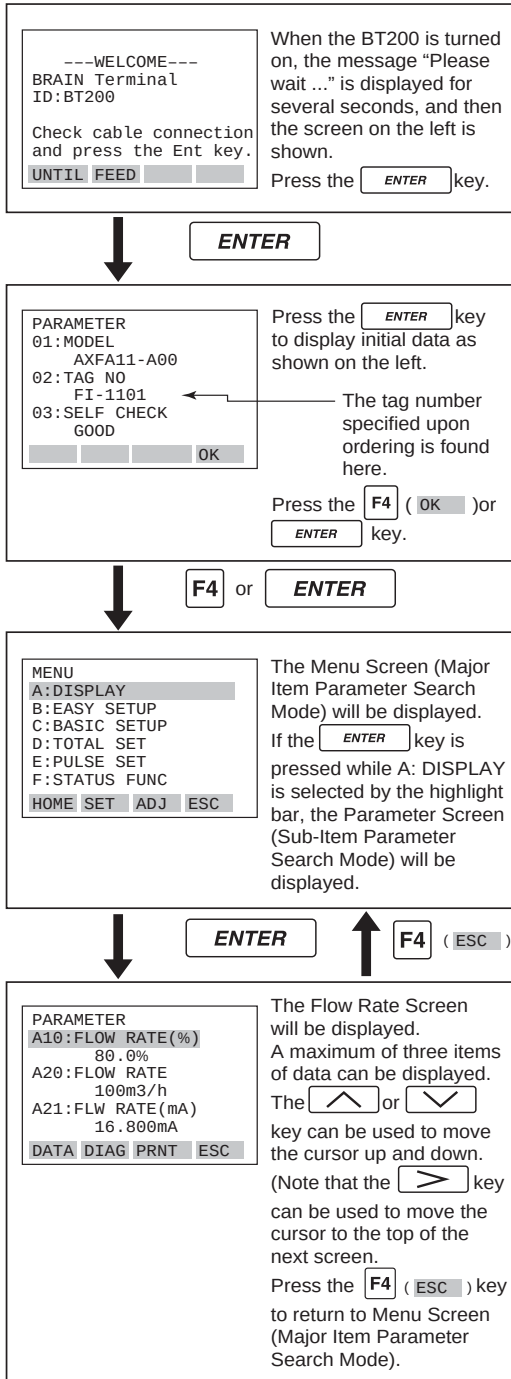
T0705.EPS

7. OPERATION VIA BRAIN TERMINAL (BT200)

7.2.3 BT200 Panels & Flow Data Display

Use the following procedure to display flow data on the BT200.

- The display of flow data is updated every 5 s.



F0706.EPS

7.3 Parameter Setting Using a BT200

The procedure for setting of data using a BT200 is described below.



IMPORTANT

If the flowmeter power is turned off within 30 s after settings have been made, these settings will be canceled. Accordingly, please ensure that the power remains on for at least 30 s after making settings.



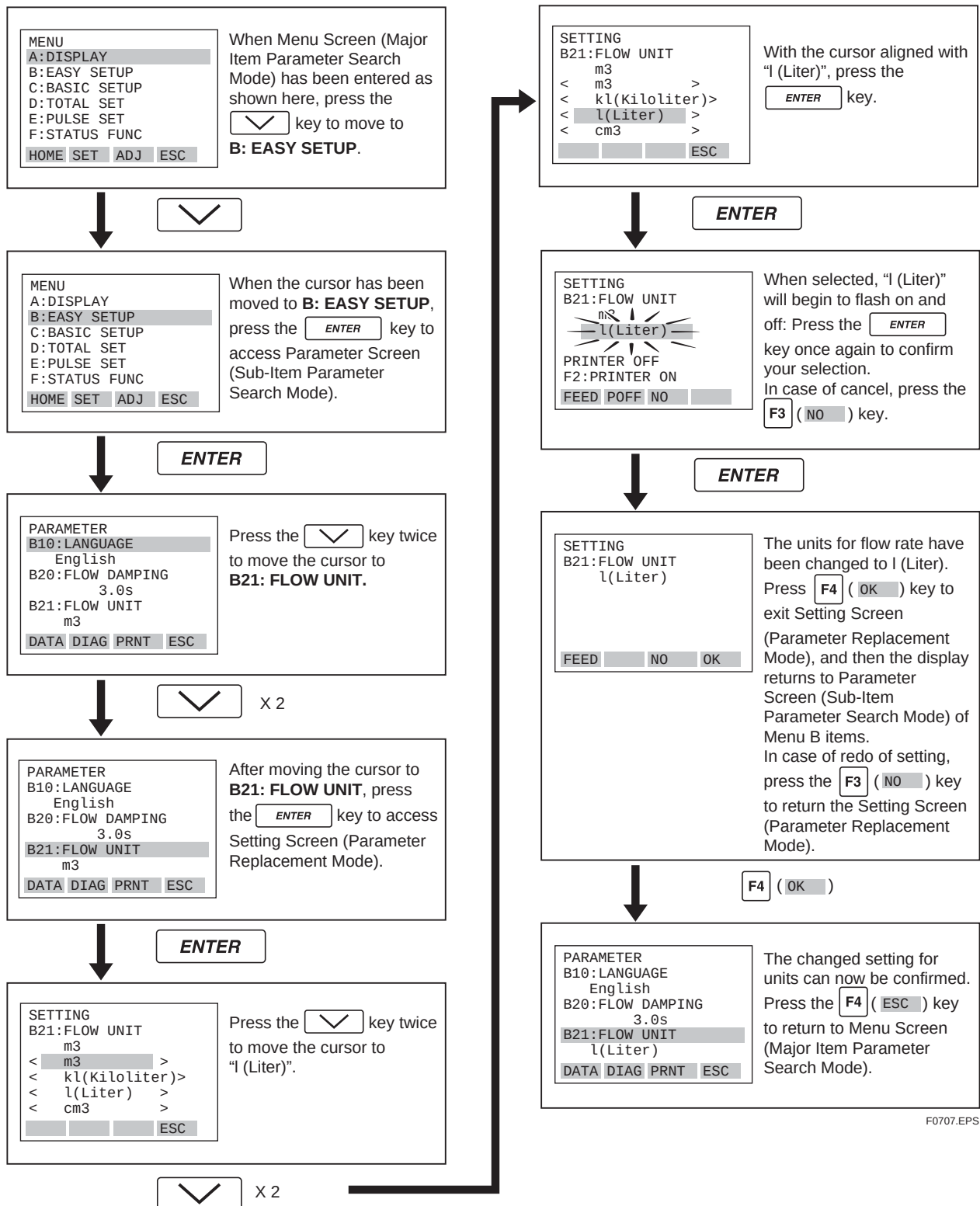
NOTE

Before updating any setting, remember to always check the data content you want to change as described in Chapter 6: Parameter Description.

7.3.1 BT200 Setting of Selection-Type Data: Flow-rate units

In this example, the flow-rate units specified by the selection-type parameter **B21: Flow Unit** are changed from m<sup>3</sup> to l.

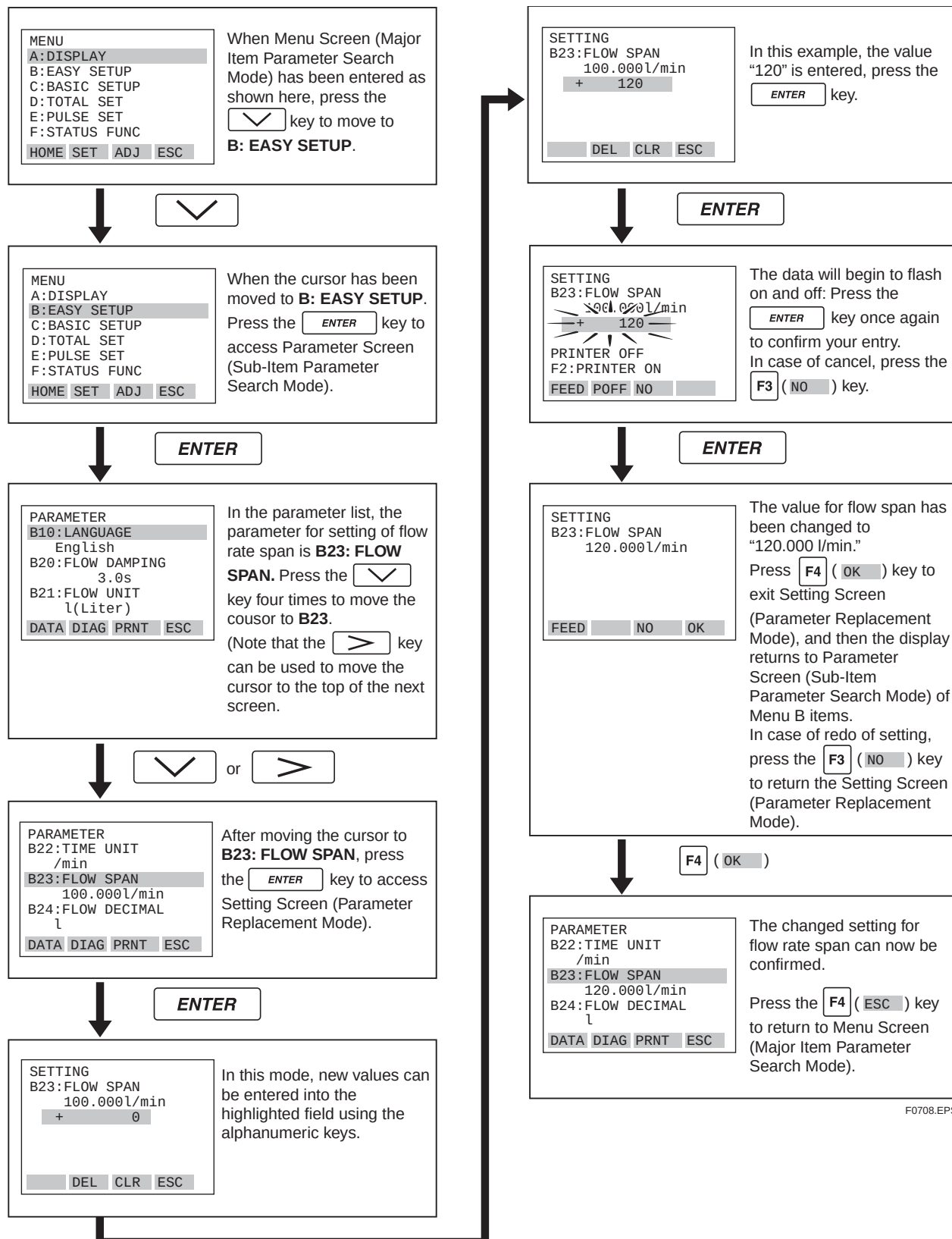
## 7. OPERATION VIA BRAIN TERMINAL (BT200)



F0707.EPS

### 7.3.2 BT200 Setting of Numeric-Type Data: Flow-rate span

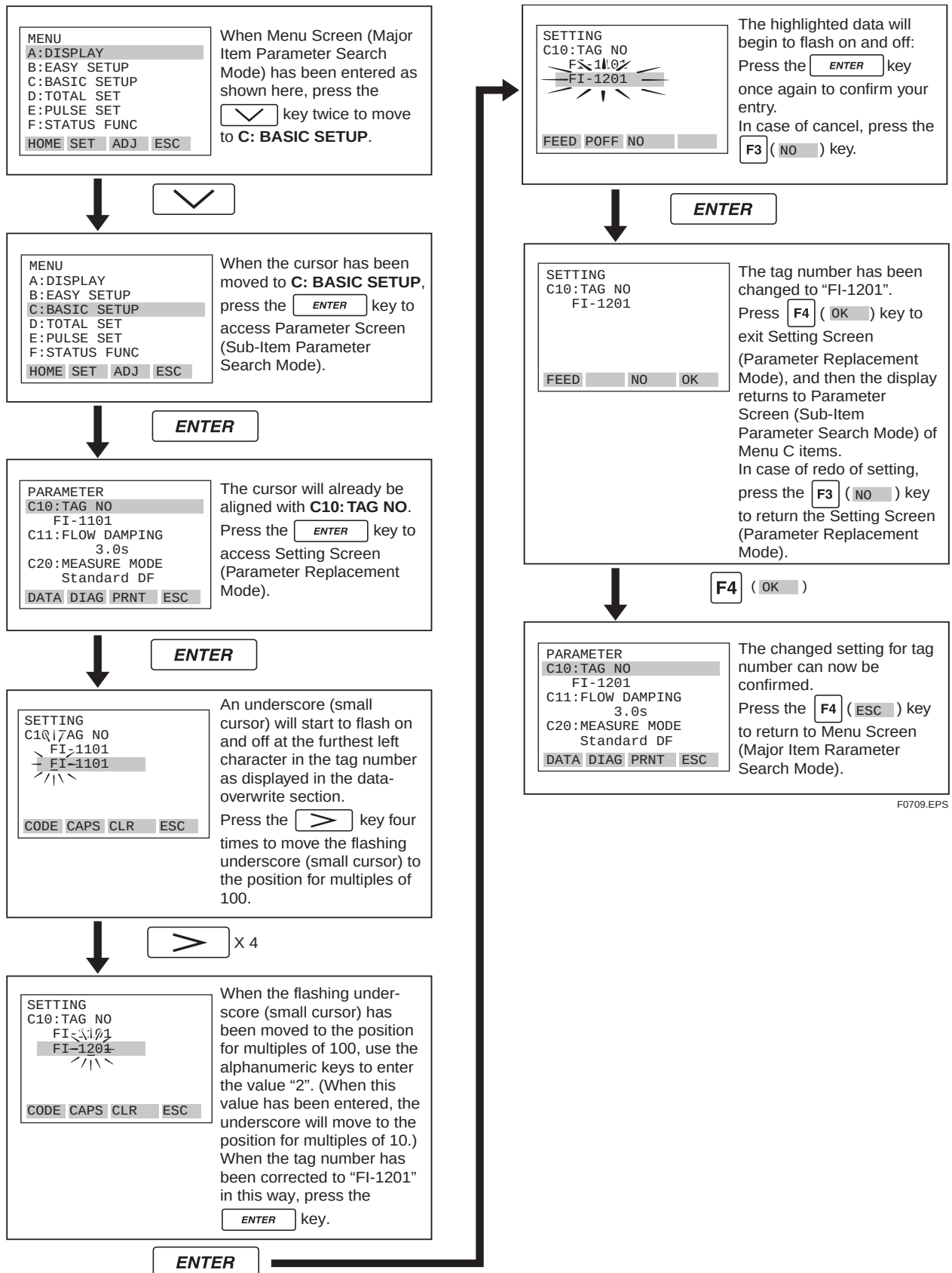
In this example, the flow-rate span specified by the numeric-type parameter **B23: Flow Span** is changed from 100.000 l/min. to 120.000 l/m.



F0708.EPS

### 7.3.3 BT200 Setting of Alphanumeric-Type Data: Tag number

In this example, the tag number specified by the alphanumeric-type parameter **C10: TAG NUMBER** is changed from "FI-1101" to "FI-1201".



F0709.EPS

## 7. OPERATION VIA BRAIN TERMINAL (BT200)

# 8. OPERATION VIA HART COMMUNICATOR



## NOTE

This chapter describes the AXFA14 converter as an example. The same attention must be paid to the AXF integral flowmeter.



## CAUTION

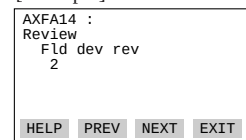
Matching of communicator DD and instrument DD

Before using the Model 275 HART Communicator, check that the DD (Device Description) installed in the communicator matches that of the instruments to be set up. To check the DD in the instrument or the HART Communicator, follow the steps below. If the correct DD is not installed in the communicator, you must upgrade the DD at the official HART programming sites. For communication tools other than Model 275 HART Communicator, contact the respective vendors for upgrade information.

### 1. Checking the DD in the instrument

- 1) Connect the communicator to the instrument to be set up.
- 2) Open "Device Setup" and press [→].
- 3) Select "Review" and press [→].
- 4) Select "Review 4" and press [→].
- 5) By pressing [NEXT] or [PREV], locate "Fld dev rev" to show the DD of the instrument.

[Example]

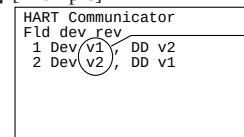


"The instrument DD is Version 2"

### 2. Checking the DD in Model 275 HART Communicator.

- 1) Turn on only the communicator alone.
- 2) Select "Utility" from the main menu and press [→].
- 3) Select "Simulation" and press [→].
- 4) Select "YOKOGAWA" from the manufacturers list by pressing [↓] and then pressing [→] to enter selection.
- 5) Select the model name of the instrument (i.e. AXFA14) by pressing [↓] and then press [→] to show the DD of the communicator.

[Example]



Versions  
1 and 2

"The communicator DD supports Versions 1 and 2."

F0801.EPS



## IMPORTANT

Be sure to set parameters as "Protect" on the write protect function after the finish of parameter setting. Refer to the "Menu P: Parameter Protection Items" and section "10.2.2" in detail.



## NOTE

In case of HART Communicator, the parameters are displayed in English only. Even if the language with the exception of English is selected at "Language" setting display, the parameters are displayed in English upon HART Communicator.

## 8.1 Conditions of Communication Line

### 8.1.1 Interconnection between AXFA14 and HART Communicator

The HART Communicator can interface with the AXFA14 from the control room, the AXFA14 site, or any other wiring termination point in the loop, provided there is a minimum load resistance of 230  $\Omega$  between the connection and the receiving instrument. To communicate, it must be connected in parallel with the AXFA14, and the connections must be non-polarized. Figure 8.1.1 illustrates the wiring connections for a direct interface at the AXFA14 site. The HART Communicator can be used for remote access from any terminal strip as well.

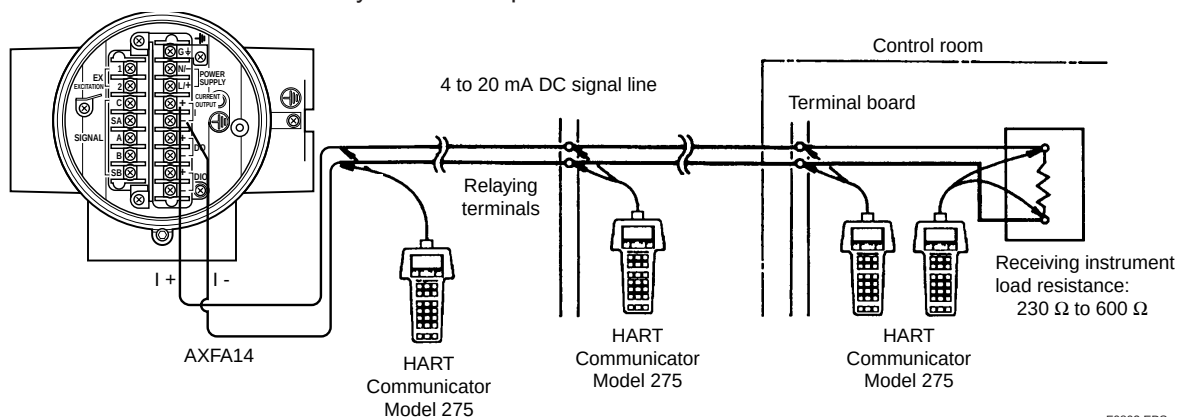


Figure 8.1.1 Interconnection Diagram

F0802.EPS

### 8.1.2 Communication Line Requirements

#### Specifications for Communication Line:

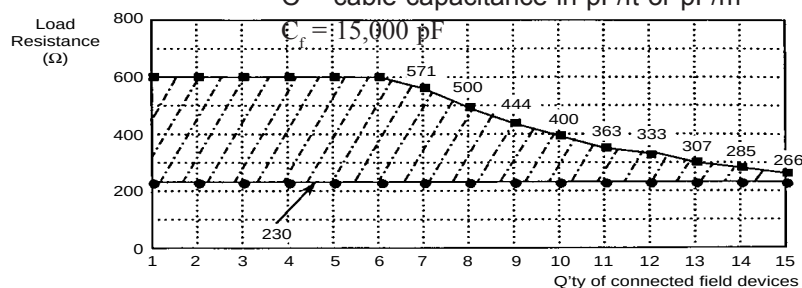
- Load resistance: 230 to 600  $\Omega$  (including cable resistance)
- Minimum cable size: 24 AWG, (0.51 mm diameter)
- Cable type: Single pair shielded or multiple pair with overall shield
- Maximum twisted-pair length: 6,500 ft (2,000 m)
- Maximum multiple twisted-pair length: 3,200 ft (1,000 m)
- Use the following formula to determine cable length for a specific application:

$$L = \frac{65 \times 10^6}{(R \times C)} - \frac{(C_f + 10,000)}{C}$$

where: L = length in feet or meters

R = resistance in ohms, current sense resistance

C = cable capacitance in pF/ft or pF/m



\* Maximum Load Voltage: 600  $\Omega \times 25 \text{ mA} = 15 \text{ V}$

F0803.EPS

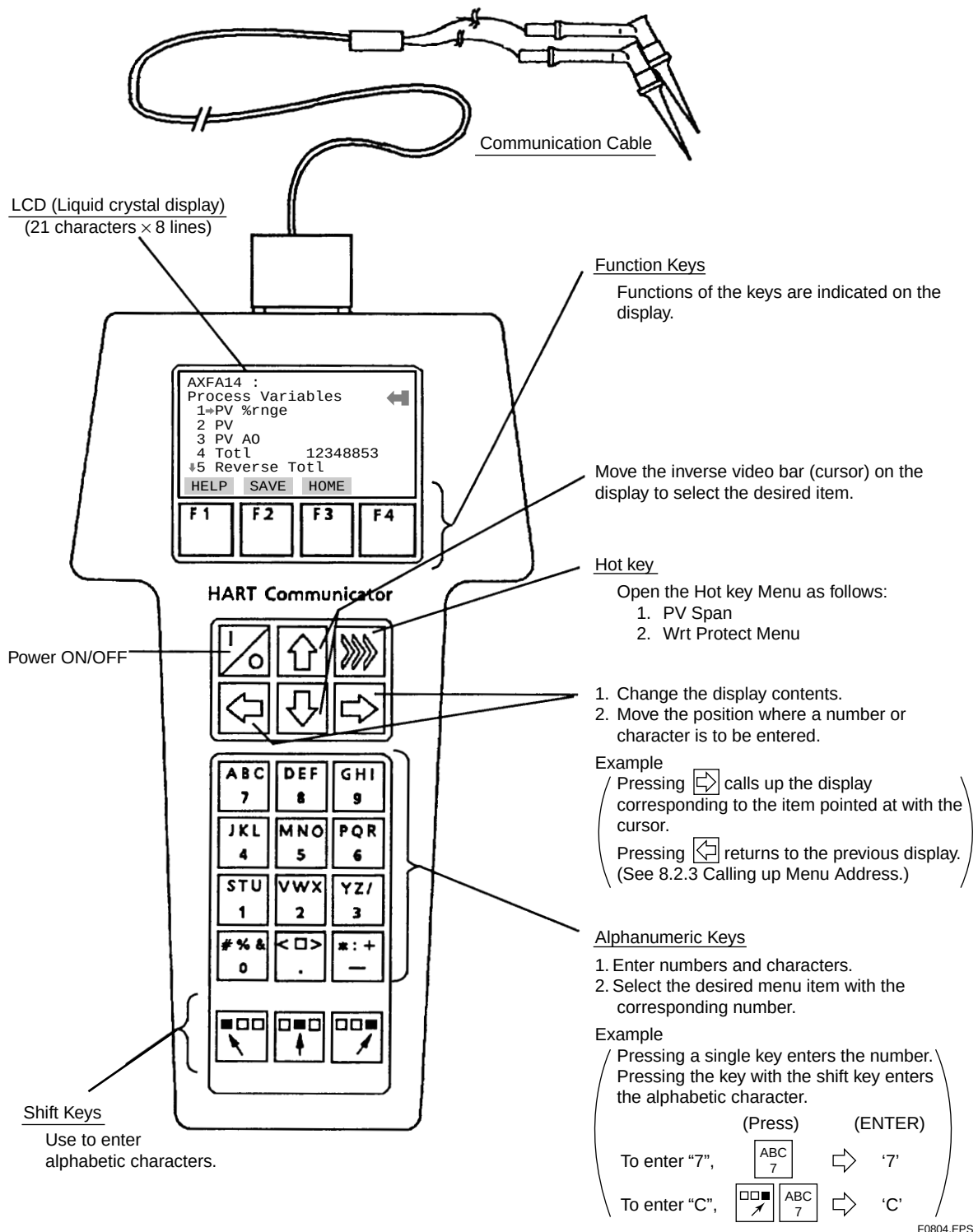


#### NOTE

The above graph shows the load resistance where in each current output of all of the connected transmitters is 4 mA.

## 8.2 Basic Operation of the HART Communicator (Model 275)

### 8.2.1 Keys and Functions

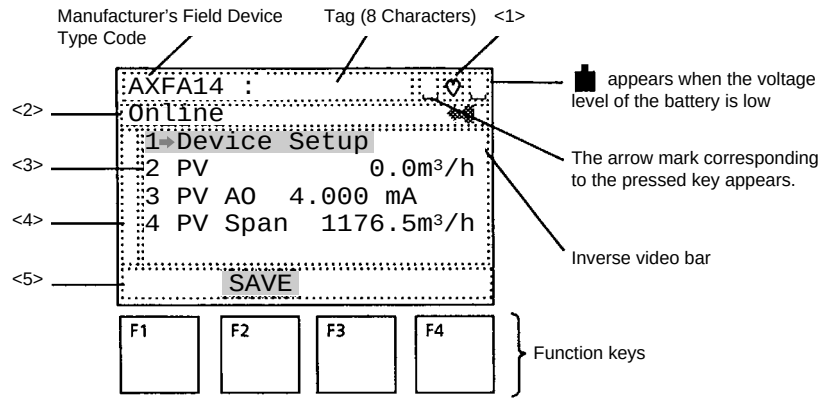


F0804.EPS

Figure 8.2.1 HART Communicator

## 8.2.2 Display

The HART Communicator automatically searches for the AXFA14 on the 4 to 20 mA loop when it is turned on. When the HART Communicator is connected to the AXFA14, it displays the “**Online**” menu as shown below. (If AXFA14 is not found, the communicator displays the message “No Device Found. Press OK...” Press the OK ‘F4’ function key and the main menu appears. Please retry after confirming the connection with the AXFA14.)



F0805.EPS

Figure 8.2.2 Display

- <1> (♥) appears and flashes during communication between the HART Communicator and the AXFA14. In Burst Mode\*, ♥ appears.
- <2> The current display menu title appears.
- <3> Each item in menu <2> appears.
- <4> ↓ and/or ↑ appear when the items are scrolled out of the display.
- <5> On any given menu, the label appearing above a function key indicates the function of that key for the current menu.

\* Refer to “8.3.4.7 Burst Mode”.

## 8.2.3 Calling Up Menu Addresses

The 8.3.5 Menu Tree shows the configuration of the “**Online**” menu which is needed for operation with the HART Communicator. The desired item can be displayed with ease by understanding the menu configuration.

When the HART Communicator is connected to the AXFA14, the “**Online**” menu will be displayed after the power is turned on (see figure 8.2.2). Open the desired item as follows:

### Key Operation

There are two ways of selecting the desired menu item.

1. Use the ↓ or ↑ key to select the desired item, and then press the → key.
2. Press the number key displayed for the desired item.
  - To return to the previous display, press the ← key, **EXIT (F4)**, **ESC (F3)** or **ABORT (F3)**.



### NOTE

Setting parameters on the display unit of the AXFA14 is not possible during HART Communication.

### 8.2.4 Entering, Setting and Sending Data

The data which are input with the keys are set in the HART Communicator by pressing **ENTER (F4)**. Then, by pressing **SEND (F2)**, the data are sent to the AXFA14. Note that the data are not set in the AXFA14 if **SEND (F2)** is not pressed. All the data set with the HART Communicator is held in memory unless power is turned off, so every data can be sent to the AXFA14 at one lot.

## 8.3 Parameters

### 8.3.1 Parameter Configuration

The parameters of the HART Communicator are constructed hierarchically. The menu tree for the “**Online**” menu is shown in the 8.3.3 Menu Tree. See “Chapter 6. Parameter Description” about the function of each parameter. Note the differences between the parameters on the AXFA14 display and those on HART Communicator.

The “**Online**” menu summary is shown below.

**Table 8.1.3 Online Menu Summary**

| No. | Display Item | Contents                                   |
|-----|--------------|--------------------------------------------|
| 1   | Device Setup | Set parameters for AXFA14.                 |
| 2   | PV           | Display process value in engineering unit. |
| 3   | PV AO        | Display analog output in mA.               |
| 4   | PV Span      | Display set span in engineering unit.      |

T0801.EPS

### 8.3.2 Data Renewing

There are two methods to load the AXFA14 data from/to the HART Communicator – periodic data renewing and discretionary data renewing.

#### (1) Periodic Data Renewing

The following data are renewed in 0.5 to 2 second cycles.

PV, PV AO, PV % mge, Totl, Reverse Totl, Dif Totl, Power Frequency, Velocity Check,

Operation Time, Alm Record 1, Alm Record Time 1, Alm Record 2, Alm Record Time 2, Alm Record 3, Alm Record Time 3, Alm Record 4, Alm Record Time 4, Test DIO (I), Write protect.

#### (2) Discretionary Data Renewing

The following data can be loaded from/to the AXFA14. Upload can be done with **SAVE (F2)** on any the “**Online**” menu selection, and download can be done on the **Saved Configuration** menu in the “**Offline**” menu. (Refer to HART Communicator Manual.)

PV Damping, Nominal Size Unit, Nominal Size, Base Flow Unit, Base Time Unit, PV Span, Flow Decimal Pnt, Density Unit, Mass Flow Density, User Span Select, Flow User Unit, Flow User Span, Total Unit, Total Scale, Total Decimal Pnt, Total Low Cut, Total Execution, Ttl Set Val Lower, Ttl Set Val Upper, Ttl Switch Lower, Ttl Switch Upper, Ttl User Select, Ttl User Unit, Pulse Unit, Pulse Scale, Pulse Width, Pulse Low Cut, DO Function, DIO Function, DO Active Mode, DIO Active Mode, Forward Span2, Forward Span3, Forward Span4, Reverse Span1, Reverse Span2, Auto Range Hys, Bi Direction Hys, Low Alarm, High Alarm, Low Low Alarm, High High Alarm, H/L Alarm Hys, 4-20mA Alarm Out, Alm-Setting, Alm-Sig Over, Alm-Emp Pipe, Alm-HH/LL, Alm-Adhesion, Display Select1, Display Select2, Display Select3, Display Cycle, Language, 4-20mA Low Cut, 4-20mA Low Lmt, 4-20mA High Lmt, Flow Direction

**NOTE**

Data changed with the HART Communicator is sent to the AXFA14 by pressing **SEND (F2)** of the HART Communicator.

**8.3.3 Checking for Problems**

The self-diagnostic function of the AXFA14 is explained in Chapter 6.5 "Alarm Functions". By using the HART Communicator, it is also possible to carry out this function in the "Test/Status" parameter. Test for each error.

\* Open the "Test/Status" setting display:

1. Device Setup → 2. Diag/Service → 1. Test/Status

**8.3.4 Setting Parameters**

As mentioned in Section 5.2.2 "Setting Mode," the AXFA14's parameters are divided into three types:

- i. Selection type
- ii. Numeric type
- iii. Alphanumeric type

This section describes how to set these parameters using a HART communicator.

**NOTE**

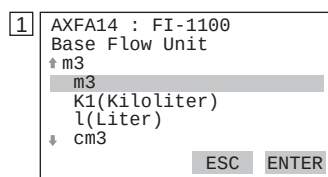
All three parameters must be set to obtain a correct signal.  
Nominal size, flow span and meter factor must be set.

**8.3.4.1 Example of Setting Selection-Type Data: Base Flow Unit**

This example describes the setting of the flow rate units for the selection-type parameter "Base Flow Unit" from m<sup>3</sup> to l (liter).

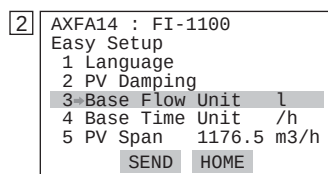
Open the "Base Flow Unit" setting display.

1. Device Setup → 3. Easy Setup → 3. Base Flow Unit

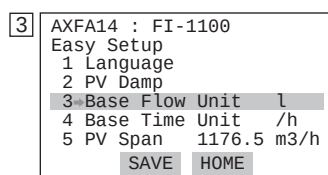


×2

Select "Liter".



Press ENTER (F4).



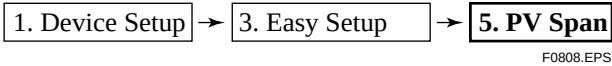
Press SEND (F2) to set the data into the AXFA14.

### 8.3.4.2 Example of Setting Numeric-Type Data: PV Span

This example describes the setting of the flow rate span for the numeric-type parameter “PV Span” from 100 l/min to 120 l/min.

There are two ways to open the “PV Span” setting display. Following the menu tree configuration, “PV Span” is opened as follows:

To open “PV Span” using the “Hot key”, proceed as follows:



#### NOTE

The “Hot key” can be used to set the easy call up parameters, “PV Span” (Flow Span) and “Wrt Protect Menu” (Write protect function).

Open the “PV Span” setting display.



- 1

AXFA14 :  
Online  
1 Device setup  
2 PV 0.0m³/h  
3 PV A0 4.000 mA  
4 PV Span  
SAVE

Press Hot key.
- 2

AXFA14 : FI-1100  
Hot key  
1 PV Span 100 l/h  
2 Wrt Protect Menu  
SAVE

Select “PV Span”.
- 3

AXFA14 : FI-1100  
PV Span  
100 l/h  
100  
DEL ESC ENTER

‘120’

Enter “120” with alphanumeric keys.
- 4

AXFA14 : FI-1100  
PV Span  
100 m³/h  
120  
DEL ESC ENTER

F4

(ENTER)

Press ENTER (F4).
- 5

AXFA14 : FI-1100  
Hot key  
1 PV Span 120 l/h  
2 Wrt Protect Menu  
SEND

F2

(SEND)

Press SEND (F2) to set the data into the AXFA14.

Return to the previous display by pressing or .

F0809.EPS

8. OPERATION VIA HART COMMUNICATOR

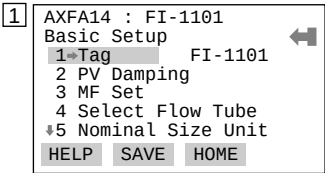
8.3.4.3 Example of Setting Alphanumeric-Type Data: Tag Number

This example describes the setting of the tag number for the alphanumeric-type parameter ‘Tag’ from “FI-1101” to “FI-1201”.

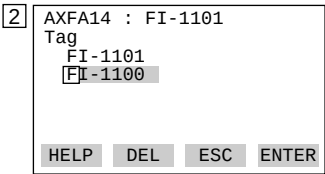


Display

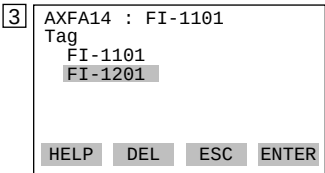
Operation



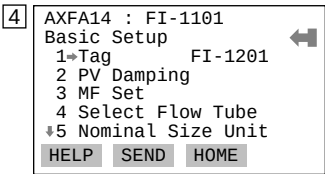
 or  Select “Tag”.



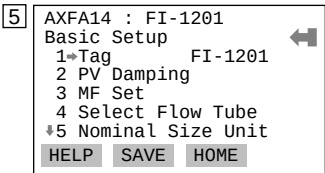
The display for the Tag setting appears.  
(The default value of “Tag” is blank.)



 ×4 Move the cursor to “1”.  
Then press “2” to change the Tag No. “FI-1101” to “FI-1201”.



  
(ENTER) Press ENTER (F4) .



  
(SEND) Press SEND (F2) to set the data into the AXFA14.  
Press HOME (F3), and return to the “Online” menu.

F0810.EPS



NOTE

In case of HART protocol, up to 8 characters can be set with “Tag”.

### 8.3.4.4 Example 1 of Other Settings: Meter Factor

The “**Meter Factor**” is engraved on the data plate of the combined flowtube.

The meter factor is required to compute the correct electromotive force proportional to the fluid velocity, and is determined by actual flow-test calibration at the factory.

Open the “**MF**” setting display:

1. Device Setup → 4. Detailed Setup → 1. Basic Setup → **3. MF Set**

- 1

AXFA14 : FI-1201  
Basic Setup  
1 Tag  
2 PV Damping  
3 MF Set  
4 Select Flow Tube  
\*5 Nominal Size Unit  
SAVE HOME

→

or

YZ/  
3

Select “**MF Set**”.
- 2

AXFA14 : FI-1201  
Select Measure Mode  
Standard DF  
Enhanced DF  
ABORT ENTER

STU  
1

or

F4  
(ENTER)

Select “**Standard DF**”.
- 3

AXFA14 : FI-1201  
Input Low MF value  
1.0000  
1 2345  
DEL ABORT ENTER

F4  
(ENTER)

Enter “1.2345” with alphanumeric keys.  
Press **ENTER (F4)**.
- 4

AXFA14 : FI-1201  
Input High MF value  
1.0000  
2 3456  
DEL ABORT ENTER

F4  
(ENTER)

Enter “2.3456” with alphanumeric keys.  
Press **ENTER (F4)**.
- 5

AXFA14 : FI-1201  
Basic Setup  
1 Tag  
2 PV Damping  
3 MF Set  
4 Select Flow Tube  
\*5 Nominal Size Unit  
SAVE HOME

F3  
(HOME)

Press **HOME (F3)**, and return to the “**Online**” menu.

F0812.EPS

8.3.4.5 Example 2 of Other Settings: Power Frequency (For DC version only)



IMPORTANT

In a situation where a DC power supply is used for converters, set “No” for “**Power Synch**” and the local commercial power frequency for “**Power Frequency**”. The local commercial power frequency is the frequency used in the vicinity where the converter is installed. The flowmeter is set to 50.00 Hz at the factory.

Open the “Power freq” setting display:



( ×9)

1

AXFA14 : FI-1201  
Aux  
6 Dead Time 0s  
7 Pulsing Flow No  
8 T/P Damp Select  
9 Power Synch No  
↓ Power Frequency  
SAVE HOME



Select “Power Frequency”.

2

AXFA14 : FI-1201  
Power Frequency  
50.00 Hz  
50.00  
DEL ESC ENTER

'60.0'

Enter “60.00” with alphanumeric keys.

3

AXFA14 : FI-1201  
Power Frequency  
50.00  
60.00  
DEL ESC ENTER

F4  
(ENTER)

Press ENTER (F4).

4

AXFA14 : FI-1201  
Aux  
6 Dead Time 0s  
7 Pulsing Flow No  
8 T/P Damp Select  
9 Power Synch NO  
↓ Power Frequency  
SAVE HOME

F2  
(SEND)

Press SEND (F2) to set the data into the AXFA14.

F3  
(HOME)

Press HOME (F3), and return to the “Online” menu.

F0813.EPS

### 8.3.4.6 Example 3 of Other Settings: Trim Analog Output

Fine output adjustment is carried out with “D/A trim” or “Scaled D/A trim”.

- **D/A trim**

“D/A trim” is to be carried out if the calibration digital ammeter does not read exactly 4.000 mA and 20.000 mA with output signals of 0 % and 100 %.

- **Scaled D/A trim**

“Scaled D/A trim” is to be carried out if the output is adjusted using a voltmeter or other types of meters with a 0% to 100 % scale.

Example 1: For adjustments using an  $\mu$ A-meter (capable of measuring  $\pm 1\mu$ A.)

F0814-1.EPS

Open the “Output trim” display:

1. Device Setup → 2. Diag/Service → 2. Adjustment → 3. D/A trim

- |                                                                                                                                       |                                                                                   |                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 AXFA14 : FI-1201<br/>Adjustment<br/>1 Auto Zero Exe<br/>2 Magflow Zero<br/>3 D/A trim<br/>4 Scaled D/A trim</p> <p>SAVE HOME</p> |  | <p>Select “D/A trim”.</p>                                                                                                                                                                                                                                                                                                                                     |
| <p>2 AXFA14 : FI-1201<br/>WARN-Loop should be<br/>removed from<br/>automatic control</p> <p>ABORT OK</p>                              | <p>F4</p> <p>(OK)</p>                                                             | <p>Press OK (F4).</p>                                                                                                                                                                                                                                                                                                                                         |
| <p>3 AXFA14 : FI-1201<br/>Connect reference<br/>meter</p> <p>ABORT OK</p>                                                             | <p>F4</p> <p>(OK)</p>                                                             | <p>Connect an ammeter (capable of measuring <math>\pm 1\mu</math>A), and press OK (F4).</p>                                                                                                                                                                                                                                                                   |
| <p>4 AXFA14 : FI-1201<br/>Setting fld dev<br/>output to 4mA</p> <p>ABORT OK</p>                                                       | <p>F4</p> <p>(OK)</p>                                                             | <p>Press OK (F4), and the AXFA14 outputs an output signal of 0%.</p>                                                                                                                                                                                                                                                                                          |
| <p>5 AXFA14 : FI-1201<br/>Enter meter value<br/>4.0000</p> <p>HELP DEL ABORT ENTER</p>                                                | <p>‘4.115’</p> <p>F4</p> <p>(ENTER)</p>                                           | <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> <math>\mu</math>A-meter reading: 4.115         </div> <p>Enter the <math>\mu</math>A-meter’s reading of 4.115, and press ENTER (F4).<br/>(The output of the AXFA14 changes.)</p>                                                                                                     |
| <p>6 AXFA14 : FI-1201<br/>Fld dev output 4.000<br/>mA equal to reference<br/>meter?<br/>1 Yes<br/>2 No</p> <p>ABORT ENTER</p>         | <p>F4</p> <p>(ENTER)</p>                                                          | <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> <math>\mu</math>A-meter reading: 4.000         </div> <p>Because the reading on the <math>\mu</math>A-meter is 4.000 mA, select “Yes” and press ENTER (F4).<br/>If the reading is not 4.000 mA, select “No”.<br/>Repeat step 5 until the <math>\mu</math>A-meter reads 4.000 mA.</p> |
| <p>7 AXFA14 : FI-1201<br/>Setting fld dev<br/>output to 20mA</p> <p>ABORT OK</p>                                                      | <p>F4</p> <p>(OK)</p>                                                             | <p>Press OK (F4), and the AXFA14 : FI-1201 outputs an output signal of 100 %.</p>                                                                                                                                                                                                                                                                             |

F0814-2.EPS

8. OPERATION VIA HART COMMUNICATOR

8 AXFA14 : FI-1201  
Enter meter value  
20.000

HELP DEL ABORT ENTER

'19.050'  
F4  
(ENTER)

μA-meter reading: 19.050

Carry out the same procedures as those described 15 .

9 AXFA14 : FI-1201  
Fld dev output 20.000  
mA equal to reference  
meter?  
1 Yes  
2 No

ABORT ENTER

F4  
(ENTER)

μA-meter reading: 20.000

“Returning fld dev to original output” appears.

10 AXFA14 : FI-1201  
NOTE-Loop may be  
returned to automatic  
control

OK

F4  
(OK)

Press OK (F4).

11 AXFA14 : FI-1201  
Adjustment  
1 Auto Zero Exe  
2 Magflow Zero  
3 D/A Trim  
4 Scaled D/A Trim

HELP SAVE HOME

F3  
(HOME)

Press HOME (F3), and return to the “Online” menu.

F0814-3.EPS

## Example 2: For adjustments using a voltmeter

F0816-1.EPS

- 1 AXFA14 : FI-1201  
Adjustment  
1 Auto Zero Exe  
2 Magflow Zero  
3 D/A trim  
4 Scaled D/A trim  
HELP SAVE HOME

JKL  
4

Select the "4. Scaled D/A trim".
- 2 AXFA14 : FI-1201  
WARN-Loop should be removed from automatic control  
ABORT OK

F4  
(OK)

Press OK (F4).
- 3 AXFA14 : FI-1201  
Trim will be scaled from 4.000 to 20.000  
1 Proceed  
2 Change  
ABORT ENTER

VWX  
2

Select "Change".  
The same operations as for "D/A trim" are required when selecting "Proceed".
- 4 AXFA14 : FI-1201  
Set scale- Lo output value  
4.000000  
4.000000  
DEL ABORT ENTER

'1'  
F4  
(ENTER)

Enter the read value on the meter when the signal is 4 mA. In this case, enter the value of the voltage across a 250  $\Omega$  resistor (1 V), and press ENTER (F4).
- 5 AXFA14 : FI-1201  
Set scale- Hi output value  
20.000000  
20.000000  
DEL ABORT ENTER

'5'  
F4  
(ENTER)

Enter the reading value on the meter when the signal is 20 mA. Then, enter "5" (5 V), and press ENTER (F4).
- 6 AXFA14 : FI-1201  
Trim will be scaled from 1.000 to 5.000  
1 Proceed  
2 Change  
ABORT ENTER

STU 1 or F4  
(ENTER)

Select "Proceed" and press ENTER (F4).
- 7 AXFA14 : FI-1201  
Connect reference meter  
ABORT OK

F4  
(OK)

Connect the voltmeter, and press OK (F4).
- 8 AXFA14 : FI-1201  
Setting fld dev output to 4mA  
ABORT OK

F4  
(OK)

Press OK (F4). The output signal of 0 % is output.

F0816-2.EPS

## 8. OPERATION VIA HART COMMUNICATOR

9 AXFA14 : FI-1201  
Enter meter value  
4.000000  
4.000000  
DEL ABORT ENTER

'1.01'  
F4  
(ENTER)

Voltmeter reading: 1.010

Enter the voltmeter's reading of 1.010, and press ENTER(F4).  
(The output of the AXFA14 changes.)

10 AXFA14 : FI-1201  
Scaled output: 1.000  
equal readout  
device?  
1 Yes  
2 No  
ABORT ENTER

F4  
(ENTER)

Voltmeter reading: 1.000

Because the reading on the voltmeter is 1.000, select "Yes" and press ENTER (F4).

If the reading is not 1.000, select "No".

Repeat step until the voltmeter reads 1.000 V.

9

11 AXFA14 : FI-1201  
Setting fld dev  
output to 20mA  
ABORT OK

F4  
(OK)

Press OK (F4). The output signal of 100 % is output.

12 AXFA14 : FI-1201  
Enter meter value  
50.000000  
50.000000  
DEL ABORT ENTER

'5.21'  
F4  
(ENTER)

Voltmeter reading: 5.210

Enter the voltmeter's reading of 5.210, and press ENTER(F4).

13 AXFA14 : FI-1201  
Scaled output: 5.210  
equal readout  
device?  
1 Yes  
2 No  
ABORT ENTER

F4  
(ENTER)

Voltmeter reading: 5.000

Select "Yes" and press ENTER (F4).

"Returning fld dev to original output" appears.

Press OK (F4).

14 AXFA14 : FI-1201  
NOTE-Loop may be  
returned to automatic  
control  
OK

F4  
(OK)

Press HOME (F3), and return to the "Online" menu.

15 AXFA14 : FI-1201  
Adjustment  
1 Auto Zero Exe  
2 Magflow Zero  
3 D/A Trim  
4 Scaled D/A trim  
HELP SAVE HOME

F3  
(HOME)

F0816-3.EPS



### IMPORTANT

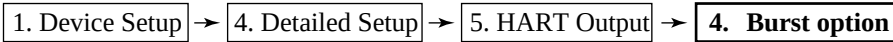
D/A trim should be executed only at single range mode. If D/A trim is executed at Bi direction mode, it is possible that the current output becomes 108 %.

### 8.3.4.7 Example 4 of Other Settings: Burst Mode

The AXFA14 continuously sends its stored data when the “**Burst mode**” is set to “On”. Any one of instantaneous flow rate, output in %, totalization values or current output can be selected and sent. The data is sent intermittently as a digital signal when the AXFA14 is set in the “**Burst mode**”.

#### Setting of Burst Mode

Open the “**Burst option**” display:



```

AXFA14 : FI-1100
Burst option
*****
PV
% range/current
Process vars/crnt
HELP      ESC  ENTER
  
```

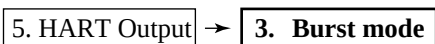
F4  
(ENTER)  
F2  
(SEND)

Select the type of data to be sent.

- Instantaneous flow rate (PV)
- Output in % and current output (% range/current)
- Instantaneous flow rate, totalization value\* and current output (Process vars/crnt)

\* “Totl”, “Reverse Totl” or “Dif Totl”

Call up “**Burst mode**” display.



```

1 AXFA14 : FI-1100
  Burst mode
  Off
  Off
  On
  ESC  ENTER
  
```

↓  
F4  
(ENTER)

Select “**On**” and press **ENTER (F4)**.

```

2 AXFA14 : FI-1100
  HART Output
  1 Poll addr      0
  2 Num req preams 5
  3 Burst mode     On
  4 Burst option   PV
  HELP  SEND  HOME
  
```

F2  
(SEND)

Press **SEND (F2)**.

F0817.EPS

#### Exiting Burst Mode

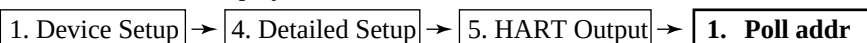
Open the “**Burst mode**” display, and select “**Off**”.

### 8.3.4.8 Example 5 of Other Settings: Multidrop Mode

Field devices in “**Multidrop Mode**” refers to the connection of several field devices on a single communication line. Up to 15 field devices can be connected when set to the multidrop mode. To activate multidrop communication, the field device address must be changed to a number from 1 to 15. This change deactivates the 4 to 20 mA output and changes it to 4 mA.

#### Setting of Multidrop Mode

Open the “**Poll addr**” display:



```

AXFA14 : FI-1100
Poll addr
0
0
HELP  DEL  ESC  ENTER
  
```

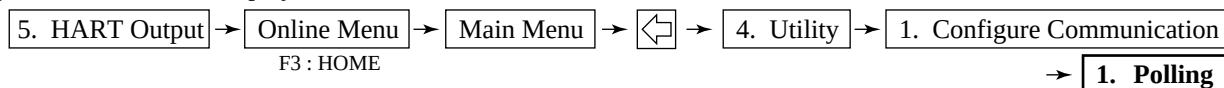
'1'  
F4  
(ENTER)  
F2  
(SEND)

Set the polling address (a number from 1 to 15) and press **ENTER (F4)**.

Then, press **SEND (F2)** to send the data.

## 8. OPERATION VIA HART COMMUNICATOR

Open the “Auto Poll” display:



1 AXFA14 : FI-1201  
HART Output  
1 Poll addr 1  
2 Num req preams 5  
3 Burst mode On  
4 Burst option PV  
HELP SAVE HOME

F3

(HOME)

Return to the “Online” menu with **HOME (F3)**.

2 AXFA14 : FI-1201  
Online  
1 Device setup  
2 PV 20m3/h  
3 PV A0 20mA  
4 PV Span 20m3/h  
SAVE



Return to the “Main” menu with a “previous” key.

3 HART Communicator  
1 Offline  
2 Online  
3 Frequency Device  
4 Utility

JLK  
4

Select “4. Utility”.

4 HART Communicator  
Utility  
1 Configure Communic  
2 system Information  
3 Listen for PC  
4 Storage Location  
5 Simulation

STU  
1

 or 



Select “1. Configure Communication”.

5 HART Communicator  
Configure Communica  
1 Polling  
2 Contrast  
3 Off Time  
4 Ignore diagnostics  
5 Delete Configs  
HELP

STU  
1

 or 



Select “1. Polling”.

6 HART Communicator  
Polling  
Never Poll  
Never Poll  
Ask Before Polling  
Always Poll  
Digital Poll  
HELP ESC ENTER



x3

F4

(ENTER)

Select “Digital Poll” and press **ENTER (F4)**.

F0819.EPS

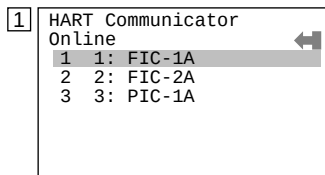


### NOTE

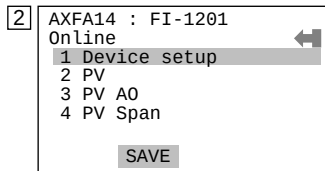
1. If “Never Poll” is selected in “Polling” when the address is assigned, the “Online Menu” cannot be called up and displayed. Be sure to select “Digital Poll” in “Polling” after assigned the polling address.
2. When the same polling address is assigned for two or more field devices in multidrop mode, communication with these field devices is disabled.

Example: Communication when set in the multidrop mode.

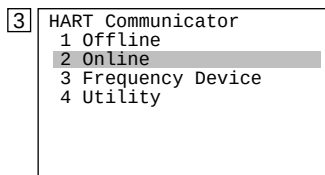
F0820-1.EPS



The HART Communicator searches for field devices that are set in the multidrop mode when the HART Communicator is turned on. When the HART Communicator is connected to one of these field devices, tag will be displayed.



Select the desired field device. After that, normal communication with the selected field device is possible. The communication speed, however, is slow in this case.



To communicate with another field device, open display [3], and select “Online”.

Display [1] will appear. Repeat the above operation.

F0820-2.EPS

### Exiting Multidrop Mode

First, open the “Poll addr” display, and assign the address to 0. Then, open the “Polling” display, and select “Never Poll”.



#### NOTE

If the above exit method is carried out in reverse order, the “Online” menu cannot be opened.

### 8.3.4.9 Example 6 of Other Settings: Write Protection

The “Write Protection” function is used to inhibit parameter changes to the AXFA14. For a more detailed description, refer to Chapter 6. Parameter Description, and Chapter 9. Maintenance.



#### NOTE

When the write protection function is activated, data setting changes in all parameters of the AXFA14 are inhibited and cannot be changed using either the HART Communicator or the AXFA14 front panel key switches.

8. OPERATION VIA HART COMMUNICATOR

Setting Password

Example: Set the password to “1 2 3 4”

F0821-1.EPS

Open “Wrt Protect Menu” in the Hot key Menu.

Hot key → 2. Wrt Protect Menu → 3. New Password

1 AXFA14 : FI-1201  
Hot key  
1 PV Span 1 m/s  
2-Wrt Protect Menu  
  
SAVE

VWX  
2



Select “Wrt Protect Menu”.

2 AXFA14 : FI-1201  
Wrt Protect Menu  
1 Write protect No  
2 Enable Wrt 10min  
3 New Password  
4 Software Seal Keep  
  
HELP SAVE

YZ /  
3

Select “New Password”.

3 AXFA14 : FI-1201  
Enter new password to  
change state of write  
protect  
  
DEL ABORT ENTER

Enter “1 2 3 4” and press ENTER (F4).

STU VWX YZ / JKL  
1 2 3 4

F4

(ENTER)

4 AXFA14 : FI-1201  
Re-enter new password  
within 30 seconds:  
1234  
1234  
  
DEL ABORT ENTER

STU VWX YZ / JKL  
1 2 3 4

F4

(ENTER)

Enter “1 2 3 4” again and press ENTER (F4).

5 AXFA14 : FI-1201  
Change to new  
password

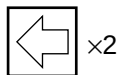
6 AXFA14 : FI-1201  
It changed the state  
of protection related  
password.  
  
OK

F4

(OK)

Press OK (F4).

7 AXFA14 : FI-1201  
Wrt Protect Menu  
1 Write protect Yes  
2 Enable Wrt 10min  
3-New Password  
4 Software Seal Keep



Press  twice, and return to the “Online” menu.

F0821-2.EPS

## Changing Password

Example: Change the password from “1 2 3 4” to “6 7 8 9 A”.

F0822-1.EPS

Open “Wrt Protect Menu” in the **Hot key** Menu.

Hot key → 2. Wrt Protect Menu → 2. Enable Wrt 10min

- 1 AXFA14 : FI-1201  
Enter current password to enable to write for 10 minutes:  
[ ]  
[DEL] [ABORT] [ENTER]

“1 2 3 4”  
[F4]  
(ENTER)

Enter the password and press **ENTER (F4)**.
- 2 AXFA14 : FI-1201  
Release the write protection for 10 minutes.  
[ABORT] [OK]

[F4]  
(OK)

Press **OK (F4)**.  
Write protect status is released for 10 minutes.
- 3 AXFA14 : FI-1201  
If you wish to release completely, you have to change password to all of spaces.  
[ABORT] [OK]

[F4]  
(OK)

Press **OK (F4)**.
- 4 AXFA14 : FI-1201  
Wrt Protect Menu  
1 Write protect No  
2 Enable Wrt 10min  
3 New Password  
4 Software Seal Keep  
[SAVE]

[→] or [YZ/3]

Select “**New Password**”.
- 5 AXFA14 : FI-1201  
Enter new password to change state of write protect  
[ ]  
[DEL] [ABORT] [ENTER]

“6 7 8 9 A”  
[F4]  
(ENTER)

Enter “**6 7 8 9 A**” and press **ENTER (F4)**.
- 6 AXFA14 : FI-1201  
Re-enter new Password  
write 30 seconds:  
6789A  
6789A  
[DEL] [ABORT] [ENTER]

“6 7 8 9 A”  
[F4]  
(ENTER)

Enter “**6 7 8 9 A**” again and press **ENTER (F4)**.
- 7 AXFA14 : FI-1201  
Change to New password
- 8 AXFA14 : FI-1201  
It changed the state of protection related password.  
[OK]

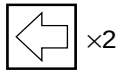
[F4]  
(OK)

Press **OK (F4)**.

F0822-2.EPS

## 8. OPERATION VIA HART COMMUNICATOR

9 AXFA14 : FI-1201  
Wrt Protect Menu  
1 Write protect Yes  
2 Enable Wrt 10min  
3 New Password  
4 Software Seal Keep



Press  twice, and return to the “Online” menu.

F0822-3.EPS



### NOTE

1. “**Enable Wrt 10min**” releases write protection status for 10 min. While write protection status is released, it is possible to enter a new password after selecting “**New Password**”. It will not be possible after the 10 min have elapsed.
2. To release write protection status completely, enter 8 spaces in the “**New Password**”. This causes the “**Write protect**” status to change from “**Yes**” to “**No**”.
3. If the power supply to either the AXFA14 exiting or the HART Communicator are turned off and then on again within 10 min after exiting write protection status, the enabled write protection status becomes defunct.

\* “**Joker password**” and “**Software Seal**”

When you forget the password that you have input, it is possible to release the mode for 10 minutes by setting a joker password in “**Enable Wrt 10 min**”. Refer to page 6-11 of this manual according the joker password.

If this joker password is used, the status shown in the parameter “**Software Seal**” is changed from “**Keep**” to “**Break**”. Press Hot key and select “**Wrt Protect Menu**”. Current status is shown in “**Software Seal**”.

This status will be returned from “**Break**” to “**Keep**” by registering a new password.

### 8.3.4.10 Other Functions and Operations

Set any other required parameters in the same way as those previous. Refer to the following document for operation information.

Product Manual for the HART Communicator: MAN 4250

## 8.3.5 Menu Tree

|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             | Read/Write                     | Parameter of BRAIN protocol |                                      |   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------|--------------------------------------|---|
| 1 Device setup           | 1 Process Variables                                                                                                                                                                                                                             | PV % rng<br>PV<br>PV A0<br>Totl<br>Reverse Totl<br>Dif Totl |                                                                                                                             |                                | R                           | A10                                  |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | R                           | A20                                  |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | R                           | A21                                  |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | R                           | A30                                  |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | R                           | A31                                  |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | R                           | A32                                  |   |
|                          | 2 Diag/Service                                                                                                                                                                                                                                  | 1 Test/Status                                               | 1 Status                                                                                                                    | Status group 1(System alarms)  | R                           | See Section 6.5<br>“Alarm Functions” |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             | Status group 3(Process alarms) | R                           |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             | Status group 5(Setting alarms) | R                           |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             | Status group 6(Setting alarms) | R                           |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             | Status group 7(Setting alarms) | R                           |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             | Status group 8(Warnings)       | R                           |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             | 2 Self test                    |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 | 2 Adjustment                                                | 1 Auto Zero Exe<br>2 Magflow Zero<br>3 D/A trim<br>4 Scaled D/A trim                                                        |                                | W                           | M10/B50                              |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | W                           | M11                                  |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | W                           | –                                    |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | W                           | –                                    |   |
|                          |                                                                                                                                                                                                                                                 | 3 Output Test                                               | 1 Loop test                                                                                                                 | 4mA<br>20mA<br>Other<br>End    |                             | W                                    | – |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | 2 Test Mode<br>3 Test DO<br>4 Test DIO (O)<br>5 Test DIO (I)                                                                |                                | W                           | N10                                  |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | W                           | N30                                  |   |
|                          |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                | W                           | N31                                  |   |
|                          |                                                                                                                                                                                                                                                 | 4 Diagnosis                                                 | 1 Adhesion Check<br>2 Adhesion Level1<br>3 Adhesion Level2<br>4 Adhesion Level3<br>5 Adhesion Level4<br>6 Adh Measure Value |                                | W                           | K10                                  |   |
|                          | W                                                                                                                                                                                                                                               |                                                             |                                                                                                                             | K11                            |                             |                                      |   |
|                          | W                                                                                                                                                                                                                                               |                                                             |                                                                                                                             | K12                            |                             |                                      |   |
|                          | W                                                                                                                                                                                                                                               |                                                             |                                                                                                                             | K13                            |                             |                                      |   |
|                          | W                                                                                                                                                                                                                                               |                                                             |                                                                                                                             | K14                            |                             |                                      |   |
|                          | R                                                                                                                                                                                                                                               | K15                                                         |                                                                                                                             |                                |                             |                                      |   |
| 3 Easy Setup             | 1 Language<br>2 PV Damping<br>3 Base Flow Unit<br>4 Base Time Unit<br>5 PV Span<br>6 Flow Decimal Pnt<br>7 Total Unit<br>8 Total Scale<br>9 Pulse Unit<br>Pulse Scale<br>Display Select1<br>Display Select2<br>Display Select3<br>Auto Zero Exe |                                                             | W                                                                                                                           | B10/H30                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B20/C11                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B21/C40                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B22/C41                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B23/C42                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B24/C43                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B30/D10                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B31/D11                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B32/E10                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B33/E11                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B40/H10                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B41/H11                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B42/H12                        |                             |                                      |   |
|                          |                                                                                                                                                                                                                                                 |                                                             | W                                                                                                                           | B50/M10                        |                             |                                      |   |
| (continued on next page) |                                                                                                                                                                                                                                                 |                                                             |                                                                                                                             |                                |                             |                                      |   |

(continued on next page)

## 8. OPERATION VIA HART COMMUNICATOR

|                  |               |                     |                   | Read/Write | Parameter of BRAIN protocol |
|------------------|---------------|---------------------|-------------------|------------|-----------------------------|
| 4 Detailed Setup | 1 Basic Setup | 1 Tag               |                   | W          | C10                         |
|                  |               | 2 PV Damping        |                   | W          | C11/B20                     |
|                  |               | 3 MF Set            | Standard DF       | W          | C20                         |
|                  |               |                     |                   | W          | C21                         |
|                  |               |                     |                   | W          | C22                         |
|                  |               |                     | Enhanced DF       | W          | C20                         |
|                  |               |                     |                   | W          | C23                         |
|                  |               |                     |                   | W          | C24                         |
|                  |               | 4 Nominal Size unit |                   | W          | C31                         |
|                  |               | 5 Nominal Size      |                   | W          | C32                         |
|                  |               | 6 Base Flow Unit    |                   | W          | C40/B21                     |
|                  |               | 7 Base Time Unit    |                   | W          | C41/B22                     |
|                  |               | 8 PV Span           |                   | W          | C42/B23                     |
|                  |               | 9 Flow Decimal Pnt  |                   | W          | C43/B24                     |
|                  |               | Velocity Check      |                   | R          | C44                         |
|                  |               | Density Unit        |                   | W          | C45                         |
|                  |               | Mass Flow Density   |                   | W          | C46                         |
|                  |               | User Span Select    |                   | W          | C47                         |
|                  |               | Flow User Unit      |                   | W          | C48                         |
|                  |               | Flow User Span      |                   | W          | C49                         |
|                  |               |                     |                   |            |                             |
|                  |               | 2 Total             |                   | W          | D10/B30                     |
|                  |               | 1 Total Unit        |                   | W          | D11/B31                     |
|                  |               | 2 Total Scale       |                   | W          | D12                         |
|                  |               | 3 Total Decimal Pnt |                   | W          | D13                         |
|                  |               | 4 Total Low Cut     |                   | W          | D20                         |
|                  |               | 5 Total Execution   |                   | W          | D21                         |
|                  |               | 6 Ttl Set Val Lower |                   | W          | D22                         |
|                  |               | 7 Ttl Set Val Upper |                   | W          | D23                         |
|                  |               | 8 Ttl Switch Lower  |                   | W          | D24                         |
|                  |               | 9 Ttl Switch Upper  |                   | W          | D30                         |
|                  |               | Ttl User Select     |                   | W          | D31                         |
|                  |               | Ttl User Unit       |                   |            |                             |
|                  |               |                     |                   |            |                             |
|                  |               | 3 Pulse             |                   | W          | E10/B32                     |
|                  |               | 1 Pulse Unit        |                   | W          | E11/B33                     |
|                  |               | 2 Pulse Scale       |                   | W          | E12                         |
|                  |               | 3 Pulse Width       |                   | W          | E13                         |
|                  |               | 4 Pulse Low Cut     |                   |            |                             |
|                  |               |                     |                   |            |                             |
|                  |               | 4 Function Set      |                   | W          | F20                         |
|                  |               | 1 Status Function   | 1 DO Function     | W          | F21                         |
|                  |               |                     | 2 DIO Function    | W          | F22                         |
|                  |               |                     | 3 DO Active Mode  | W          | F23                         |
|                  |               |                     | 4 DIO Active Mode | W          | F30                         |
|                  |               |                     | 5 Forward Span2   | W          | F31                         |
|                  |               |                     | 6 Forward Span3   | W          | F32                         |
|                  |               |                     | 7 Forward Span4   | W          | F33                         |
|                  |               |                     | 8 Reverse Span1   | W          | F34                         |
|                  |               |                     | 9 Reverse Span2   | W          | F40                         |
|                  |               |                     | Auto Range Hys    | W          | F41                         |
|                  |               |                     | Bi Direction Hys  |            |                             |
|                  |               |                     |                   |            |                             |
|                  |               | 2 Alarm             | 1 Low Alarm       | W          | G10                         |
|                  |               |                     | 2 High Alarm      | W          | G11                         |
|                  |               |                     | 3 Low Low Alarm   | W          | G12                         |
|                  |               |                     | 4 High High Alarm | W          | G13                         |
|                  |               |                     | 5 H/L Alarm Hys   | W          | G14                         |
|                  |               |                     | 6 4-20 Alarm Out  | W          | G21                         |
|                  |               |                     | 7 4-20 Burn Out   | R          | G22                         |
|                  |               |                     | 8 Alm-Setting     | W          | G30                         |
|                  |               |                     | 9 Alm-Sig Over    | W          | G31                         |
|                  |               |                     | Alm-Emp Pipe      | W          | G32                         |
|                  |               |                     | Alm-HH/LL         | W          | G33                         |
|                  |               |                     | Alm-Adhesion      | W          | G34                         |

(continued on next page)

F0823-2.EPS

## 8. OPERATION VIA HART COMMUNICATOR

|                      |                     |                   |                     | Read/Write  | Parameter of BRAIN protocol |
|----------------------|---------------------|-------------------|---------------------|-------------|-----------------------------|
| 4 Detailed setup     | 4 Function Set      | 3 Alm Record      | 1 Operation Time    | R           | G40                         |
|                      |                     |                   | 2 Alm Record1       | R           | G41                         |
|                      |                     |                   | 3 Alm Record Time1  | R           | G42                         |
|                      |                     |                   | 4 Alm Record2       | R           | G43                         |
|                      |                     |                   | 5 Alm Record Time2  | R           | G44                         |
|                      |                     |                   | 6 Alm Record3       | R           | G45                         |
|                      |                     |                   | 7 Alm Record Time3  | R           | G46                         |
|                      |                     |                   | 8 Alm Record4       | R           | G47                         |
|                      |                     |                   | 9 Alm Record Time4  | R           | G48                         |
|                      | 4 Display Set       |                   | 1 Display Select1   | W           | H10/B40                     |
| 2 Display Select2    |                     |                   | W                   | H11/B41     |                             |
| 3 Display Select3    |                     |                   | W                   | H12/B42     |                             |
| 4 Display Cycle      |                     |                   | W                   | H20         |                             |
| 5 Language           |                     |                   | W                   | H30/B10     |                             |
| 5 Aux                |                     | 1 4-20mA Low Cut  | W                   | J10         |                             |
|                      |                     | 2 4-20mA Low Lmt  | W                   | J11         |                             |
|                      |                     | 3 4-20mA High Lmt | W                   | J12         |                             |
|                      |                     | 4 Flow Direction  | W                   | J20         |                             |
|                      |                     | 5 Rate Limit      | W                   | J21         |                             |
|                      |                     | 6 Dead Time       | W                   | J22         |                             |
|                      |                     | 7 Pulsing Flow    | W                   | J23         |                             |
|                      |                     | 8 T/P Damp Select | W                   | J24         |                             |
|                      |                     | 9 Power Synch     | W                   | J30         |                             |
|                      |                     | Power Frequency   | R/W                 | J31         |                             |
|                      |                     | Memo 1            | W                   | J40         |                             |
|                      |                     | Memo 2            | W                   | J41         |                             |
|                      |                     | Memo 3            | W                   | J42         |                             |
|                      |                     | Software Rev No   | R                   | J50         |                             |
|                      |                     | 5 HART output     |                     | 1 Poll addr |                             |
| 2 Num req preams     |                     |                   |                     |             |                             |
| 3 Burst mode         |                     |                   |                     |             |                             |
| 4 Burst option       | 1 PV                |                   |                     |             |                             |
| 6 Device info        | 1 Field device info |                   | 2 % range/current   |             |                             |
|                      |                     |                   | 3 Process vars/crnt |             |                             |
|                      |                     |                   | 1 Manufacturer      |             |                             |
|                      |                     |                   | 2 Tag               |             |                             |
|                      |                     |                   | 3 Descriptor        |             |                             |
|                      |                     |                   | 4 Message           |             |                             |
|                      |                     |                   | 5 Date              |             |                             |
|                      |                     |                   | 6 Device id         |             |                             |
|                      | 7 Write protect     |                   |                     |             |                             |
|                      | 8 Revision #'s      | 1 Universal rev   |                     |             |                             |
| 2 Model specific     |                     |                   | 2 Fld dev rev       |             |                             |
|                      |                     |                   | 3 Software rev      |             |                             |
|                      |                     |                   | 1 Use               |             |                             |
| 2 Lining             |                     |                   |                     |             |                             |
| 3 Electrode Material |                     |                   |                     |             |                             |
| 4 Electrode Struct   |                     |                   |                     |             |                             |
| 5 Grounding Ring     |                     |                   |                     |             |                             |
| 6 Process Connect    |                     |                   |                     |             |                             |
| 7 Lay Length         |                     |                   |                     |             |                             |
| 8 Electrical Conn    |                     |                   |                     |             |                             |
| 9 Sensor Serial No   |                     |                   |                     |             |                             |

(continued on next page)

F0823-3.EPS

8. OPERATION VIA HART COMMUNICATOR

|          |           |
|----------|-----------|
| 5 Review | 1 Review1 |
|          | 2 Review2 |
|          | 3 Review3 |
|          | 4 Review4 |

|         |                    |                                                                            |
|---------|--------------------|----------------------------------------------------------------------------|
| Hot key | 1 PV Span          |                                                                            |
|         | 2 Wrt Protect Menu | 1 Write protect<br>2 Enable Wrt 10min<br>3 New Password<br>4 Software Seal |

|            |                                   |
|------------|-----------------------------------|
| Read/Write | Parameter<br>of BRAIN<br>protocol |
|------------|-----------------------------------|

|   |         |
|---|---------|
| W | B23/C42 |
|---|---------|

|   |     |
|---|-----|
| R | P20 |
| W | P21 |
| W | P22 |
| R | P23 |

F0823-4.EPS

## 9. ACTUAL OPERATION

---

After you have installed the flowtube into the process piping, wired the input/output terminals, set up the required parameters, and performed a pre-operation zero adjustment, the magnetic flowmeter should output an accurate flow signal from its terminals as soon as flow of the fluid to be measured begins. This section describes zero adjustment and the corresponding procedures.

### 9.1 Pre-operation Zero Adjustment

Zero adjustment is carried out to ensure that the output for zero flow is 0 % (i.e., 4 mA). Although adjustment to zero is performed at the manufacturing plant prior to shipment, this procedure must be carried out once again following the installation of piping in order to match the magnetic flowmeter to its operating conditions.

This section describes the zero adjustment procedure using display unit switches from the converter and using the external status input; accordingly, one of these methods should be selected and implemented.



#### IMPORTANT

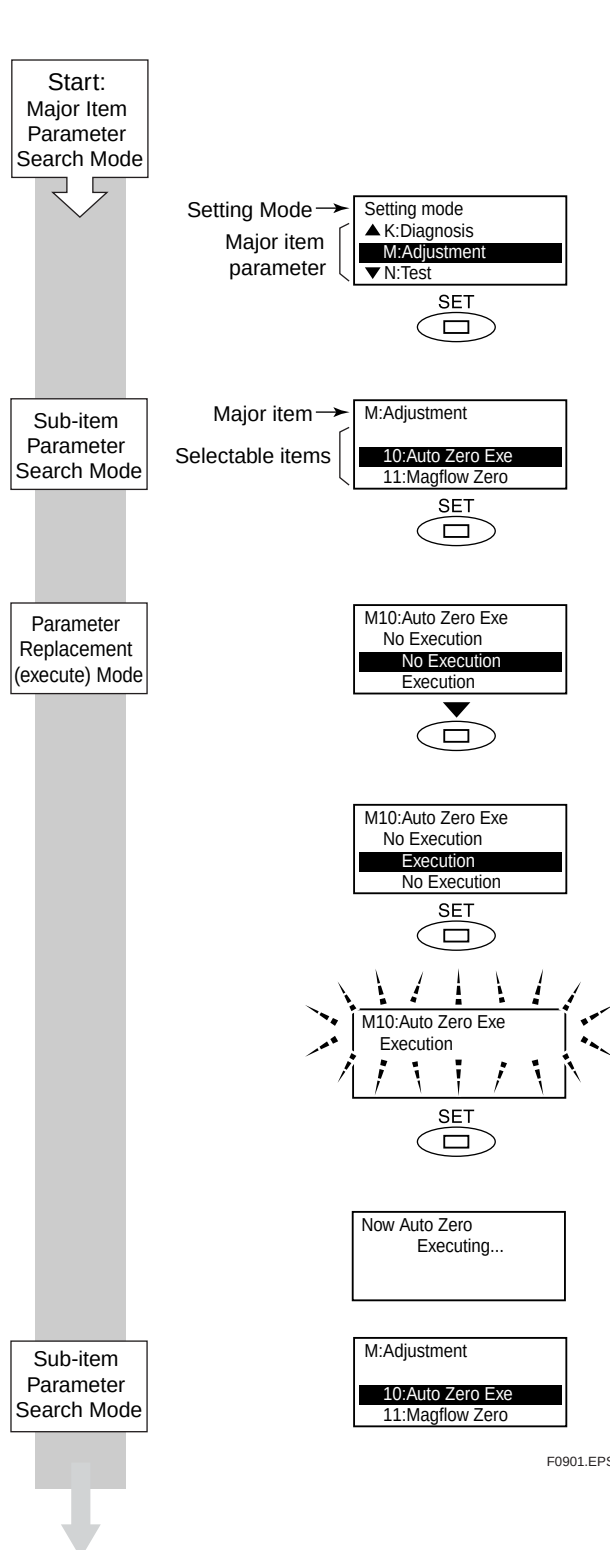
---

- Zero adjustment should be carried out before actual operation. Note that setting and update functions cannot be carried out during this procedure (i.e., for approximately 30 seconds).
  - Zero adjustment should only be carried out when the flowtube has been filled with fluid and the fluid velocity is completely zero by closing the valve.
  - Each time that the fluid being measured is changed, it will be necessary for zero adjustment to be carried out for the new fluid.
-

### 9.1.1 Zero Adjustment Using the infra red Switches

This section describes the procedure for zero adjustment using the display unit switches. (For more details regarding setting methods using these switches, refer to Chapter 5: Basic Operating Procedures.)

The parameters for zero adjustment are **B50/M10: Auto Zero Exe** (and either of these can be used to carry out this procedure). For more details regarding these parameters, refer to Chapter 6: Parameter Description. The parameter **M10: Auto Zero Exe** will be used in the following description.



Once in Setting Mode, use the  switch to move the cursor to **M: Adjustment**.

Touch the  switch to access Sub-item Parameter Search Mode.

Upon selection of **M: Adjustment**, the cursor will be positioned at **M10: Auto Zero Exe**. (Sub-item selection (D))

Touch the  switch to access Parameter Replacement Mode.

Touch the  switch to move the cursor to "Execution".

Touch the  switch to select the "Execution".

In order to request confirmation, the entire display flashes on and off. Touch the  switch once again at this time to fix selection of the automatic zero adjustment function.

Auto zero adjustment function is being executed (about 30 seconds).

When zero adjustment function has been completed, the system returns automatically to the sub-item selection screen (D).

F0901.EPS

 **NOTE**

The results of **M10: Auto Zero Exe** can be displayed using **M11: Magflow Zero**.  
Alternatively, if the results of the automatic zero adjustment exceed the rated value,  
the warning **82: Auto Zero Wng** will be displayed.

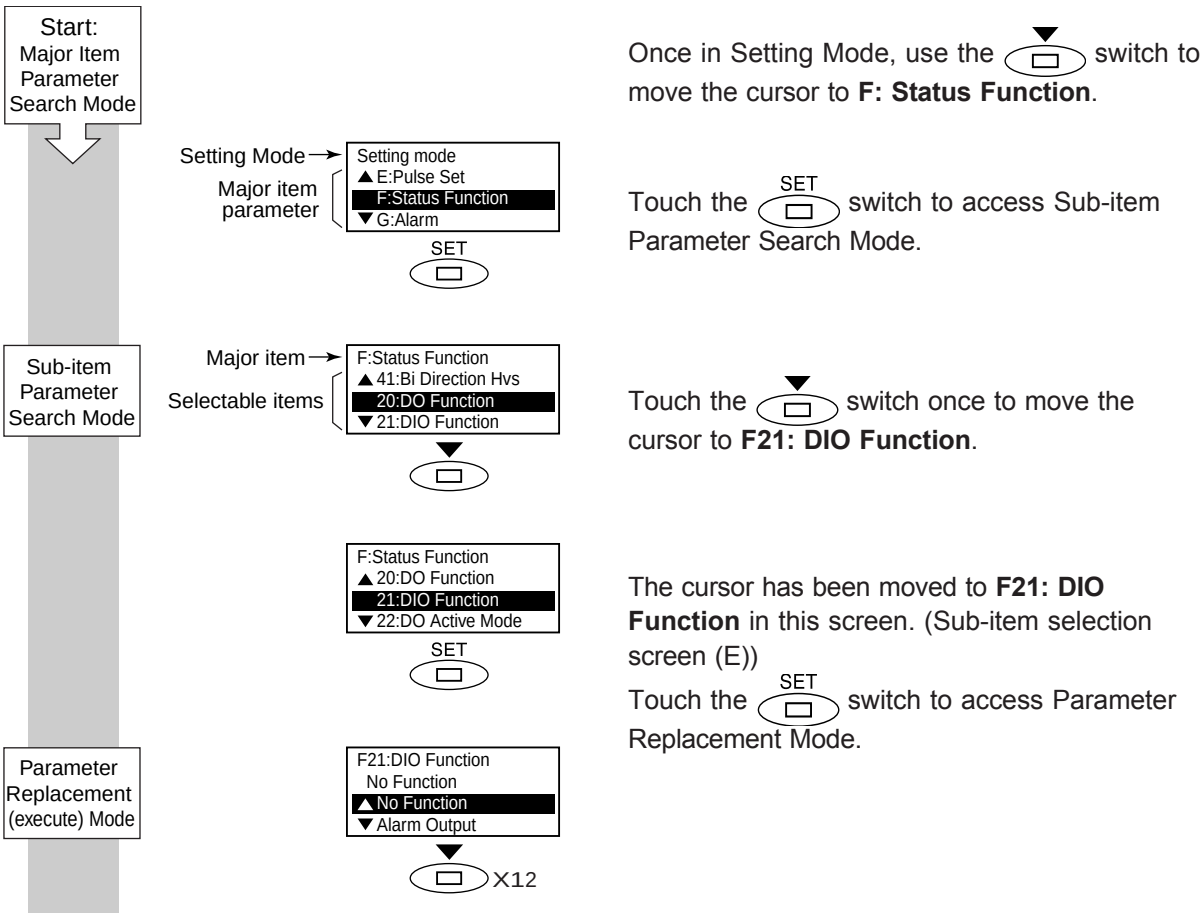
**9.1.2 Zero Adjustment via External Status Input**

This section describes the procedure for zero adjustment via external status input.  
(For more details regarding external status input, refer to Chapter 6: Parameter  
Description.)

 **CAUTION**

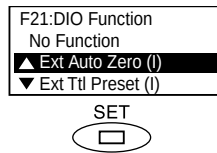
In certain cases where the multiple range function is being used with other status  
inputs, it may not be possible to perform settings for automatic zero adjustment.  
For more details, refer to the description of multiple ranges from Chapter 6:  
Parameter Description.

In order to carry out zero adjustment via external status input, it will be necessary  
to set “Ext Auto Zero (I)” using **F21: DIO Function**. The following describes the  
setting procedure:



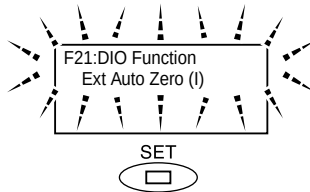
F0902-1.EPS

9. ACTUAL OPERATION

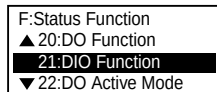


Touch the  switch twelve times to move the cursor to “Ext Auto Zero (I)”.

Touch the  switch to select “Ext Auto Zero (Zero adjustment via external status input)”.



In order to request confirmation, the entire display flashes on and off. Touch the  switch once again at this time to fix selection of the automatic zero adjustment function.

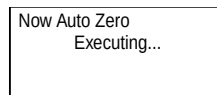


F0902-2.EPS

The system returns automatically to sub-item selection screen (E).

Zero adjustment will be started if the DIO terminals are shorted (when the active mode has been set to “Closed/Short Act” using **F23: DIO Active Mode**).

This process will end after approximately 30 s.



Auto zero adjustment function is being executed. (about 30 s.)

F0902-3.EPS



**NOTE**

When the DIO terminals continue to be shorted, this zero adjustment is automatically repeated.

# 10. MAINTENANCE

## 10.1 Components Replacement



### WARNING

- Component replacement and the associated operations must be carried out by expert engineer or skilled personnel and not by operators.
- Before opening the cover, it is important to ensure that at least 10 minutes have passed since the power was turned off. Furthermore, opening of the cover must also be carried out by expert engineer or skilled personnel.



### CAUTION

- Explosion protected type must be, as a rule, removed to a non-hazardous area for maintenance and be disassembled and reassembled to the original state.
- The display cover is locked by the special screw. In case of opening the display cover use the hexagonal wrench attached.
- Be sure to lock the cover by the special screw using the hexagon wrench attached after installing the cover.



### IMPORTANT

- As a rule, maintenance of this flowmeter should be implemented in a maintenance service shop where the necessary tools are provided.
- The amplifier assembly contains sensitive parts that may be damaged by static electricity. Exercise care so as not to directly touch the electronic parts or circuit patterns on the board, for example, by preventing static electrification by using grounded wrist straps when handling the assembly. Also take precautions such as placing a removed amplifier assembly into a bag with an antistatic coating.

## 10.1.1 Fuse Replacement



### CAUTION

Be sure to turn off the power before performing fuse replacement. Also be sure to use the spare fuse that was supplied with the product, or ones supplied by Yokogawa's sales or service offices.

The fuse holder is located on the farthest circuit board from the front.

- (1) Remove the amplifier assembly by following the procedures shown in Section 10.1.3 "Amplifier Replacement."
- (2) The fuse can be seen after step (1). Remove the fuse from the fuse holder.
- (3) Push a new fuse into the holder until it clicks.
- (4) Reinstall the amplifier assembly by following the procedures shown in Section 10.1.3.

Spare fuses are shipped with the instrument.

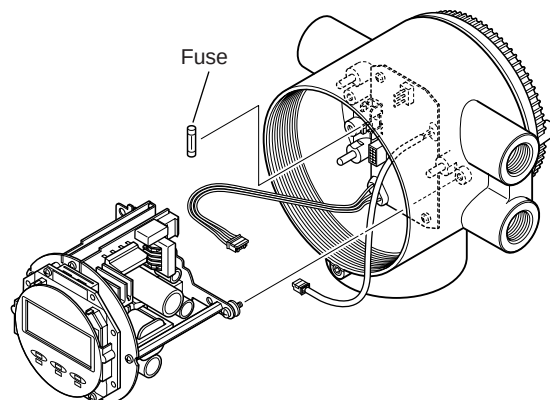


Figure 10.1.1 Fuse Replacement

## 10.1.2 Display Unit Replacement

### 10.1.2.1 Removing the Display Unit

- (1) Turn off the power.
- (2) Loosen cover locking screw 1 clockwise using a hexagonal wrench (nominal size 3) to unlock the cover. (Upon shipment from the manufacturing plant, the cover is locked.) Hold the flowmeter with your hand and remove the cover by turning it in the direction of the arrow as shown below.

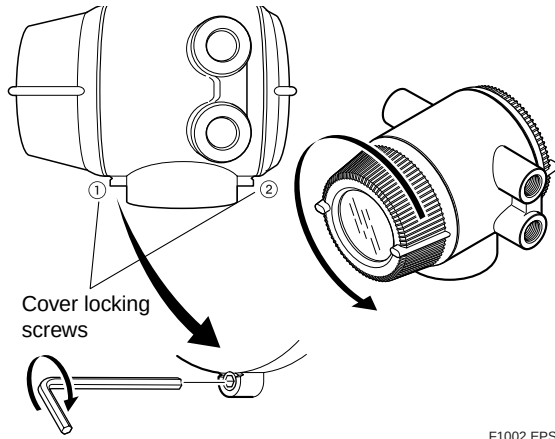


Figure 10.1.2 Removing the Display Cover

- (3) Hold the display unit with your hand and remove the two mounting screws. Remove the connector of the display unit by pulling it to the left, taking care not to damage it (refer to Figure 10.1.3).

### 10.1.2.2 Assembling the Display Unit

- (1) Align the display unit with the protrusion of the connector facing the amplifier assembly and then make the required connection.
- (2) Secure the display unit using its two mounting screws.
- (3) Replace the cover by following the procedures used to remove it in the reverse order.

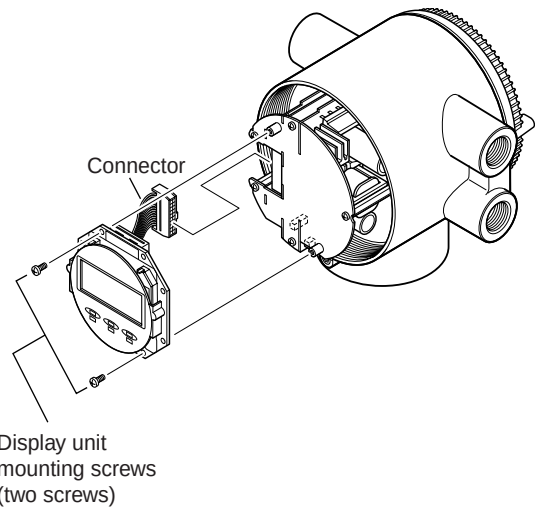


Figure 10.1.3 Removing and Assembling the Display Unit

### 10.1.2.3 Changing the Display Unit Orientation 90 °

- (1) Hold the display unit with your hand and remove the two mounting screws.
- (2) Turn the display unit 90 ° clockwise and confirm the assembling position, taking care of the connector and wire of the display unit.
- (3) Secure the display unit using its two mounting screws.

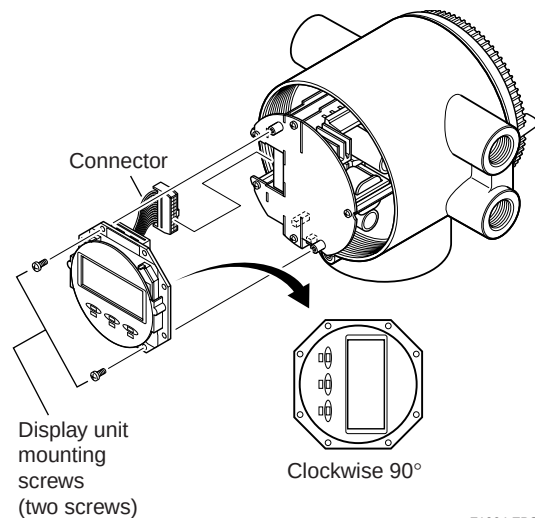


Figure 10.1.4 Assembling the Display Unit

### 10.1.2.4 Installing the Cover

- (1) Install the cover to the flowmeter by turning it in the direction of the arrow as shown below. Tighten cover locking screw 1 counterclockwise using a hexagonal wrench (nominal size 3) to lock the cover.

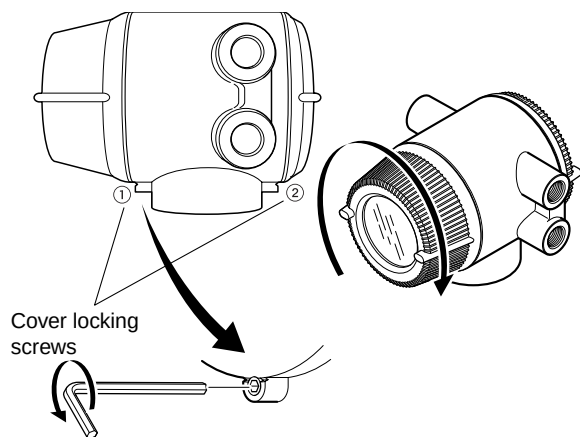


Figure 10.1.5 Installing the Display Cover

## 10.1.3 Amplifier Replacement

For FOUNDATION Fieldbus protocol please refer to IM 01E20F02-01E.



### IMPORTANT

In case of amplifier replacement, it is necessary to perform the parameter resetting.  
For parameters, refer to Chapter 6: Parameter Description.

### 10.1.3.1 Removing the Amplifier Assembly

- (1) Turn off the power.
- (2) Remove the cover.
- (3) Remove wiring connectors 1 and 2 (refer to Figure 10.1.6) from the amplifier assembly. Remove them carefully, without applying excessive force.
- (4) Loosen the three mounting screws while holding the assembly with your hand.
- (5) Pull the assembly straight out.

### 10.1.3.2 Assembling the Amplifier Assembly

- (1) To replace the amplifier assembly, follow the procedures used to remove it in the reverse order.
- (2) Replace the assembly by pushing it in, taking care not to damage the amplifier mounting connectors on the circuit board.
- (3) Carefully connect wiring connectors 1 and 2 to the amplifier assembly, making sure that the connectors' directions are correct. Let wiring connector 2 pass along the amplifier side of the rod.
- (4) Tighten the three mounting screws while holding the assembly with your hand.
- (5) Replace the cover, taking care not to entangle the cables of the wiring connectors.

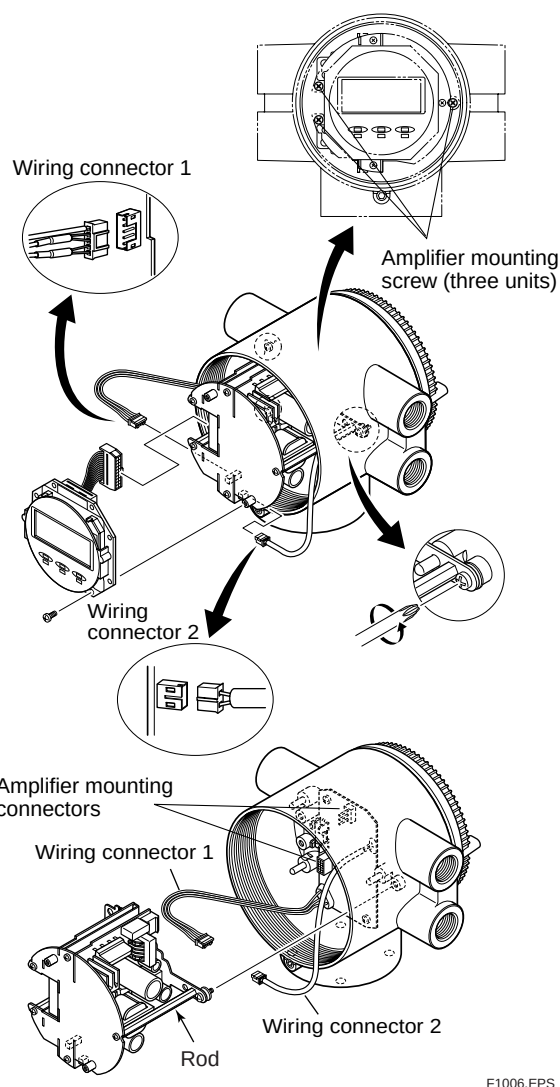


Figure 10.1.6 Assembling the Amplifier

# 10.2 Setting of Switches

## 10.2.1 Setting of Burnout Switch

The burnout function sets the direction of current output in situations where the CPU has become damaged. Upon shipment from the manufacturing plant, the burnout direction is set to High (i.e., 25 mA); however, in cases where the optional code /C1 has been specified, the output direction will be set to Low (i.e., 0 mA).

Modification of the burnout direction must be carried out using the setting switch from the amplifier's CPU board (i.e., Switch 1) (See Figure 10.2.1).

Table 10.2.1 Output Setting Pins for Burnout

| Position of Pin                                                                               | Burnout Direction | Burnout Output | Remarks                          |
|-----------------------------------------------------------------------------------------------|-------------------|----------------|----------------------------------|
| Low High<br> | High              | 25 mA          | Set to High before shipment      |
| Low High<br> | Low               | 0 mA           | Set to Low for optional code /C1 |

T1001.EPS

### NOTE

On the amplifier's CPU board, the burnout setting switch (i.e., Switch 1) and the write protect switch (i.e., Switch 2) are located adjacent to each other. Accordingly, special care should be taken when making switch settings. In case of FOUNDATION Fieldbus protocol, burnout setting switch is not supplied.

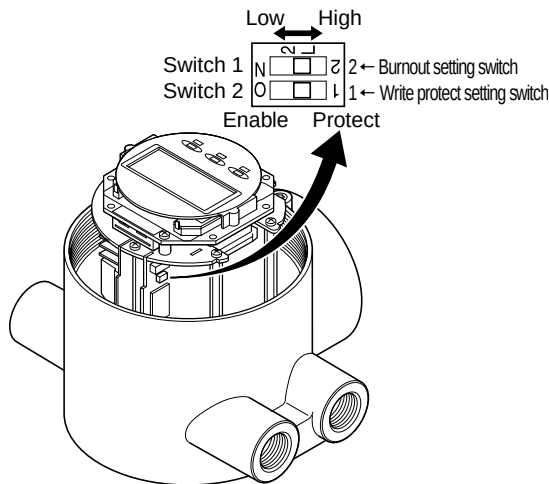
## 10.2.2 Setting of Write Protect Switch

By setting the write protect function to "Protect" it is possible to prevent the overwriting of parameters. Write protection can be carried out using either the hardware switch on the CPU board (i.e., Switch 2) or software parameter settings. If either of these items is set to "Protect," the overwriting of parameters will be prohibited.

### NOTE

If the hardware switch is set to "Protect" it will not be possible to overwrite parameters; furthermore, this condition will be maintained until the switch is set to "Enable". In case of FOUNDATION Fieldbus protocol, write protect setting switch is always set as "Enable".

For more details regarding usage of the write protect function and the software's parameter switches, refer to "Chapter 6: Parameter Description" in this user's manual.



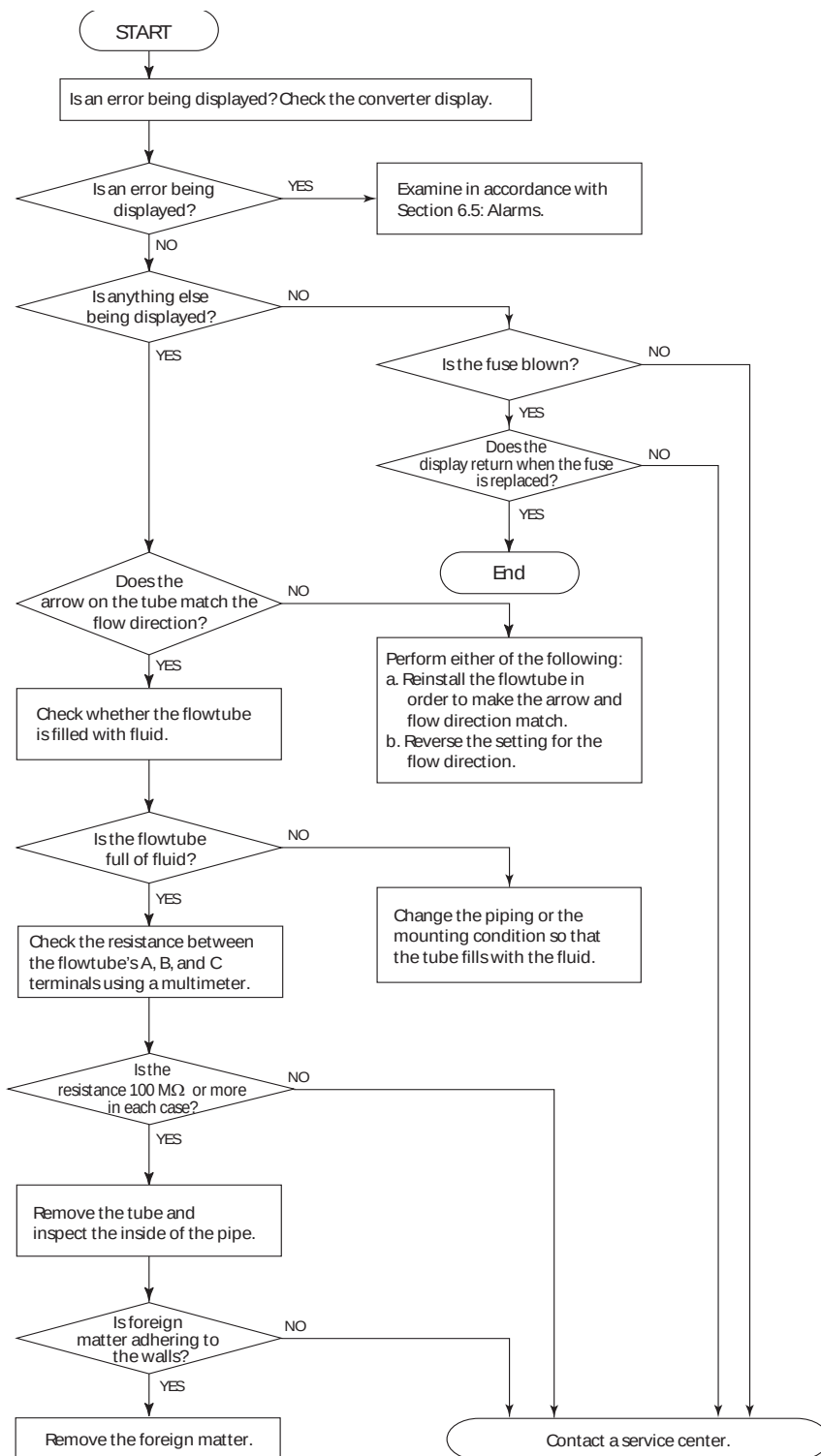
F1007.EPS

Figure 10.2.1 Switch Configuration

## 10.3 Troubleshooting

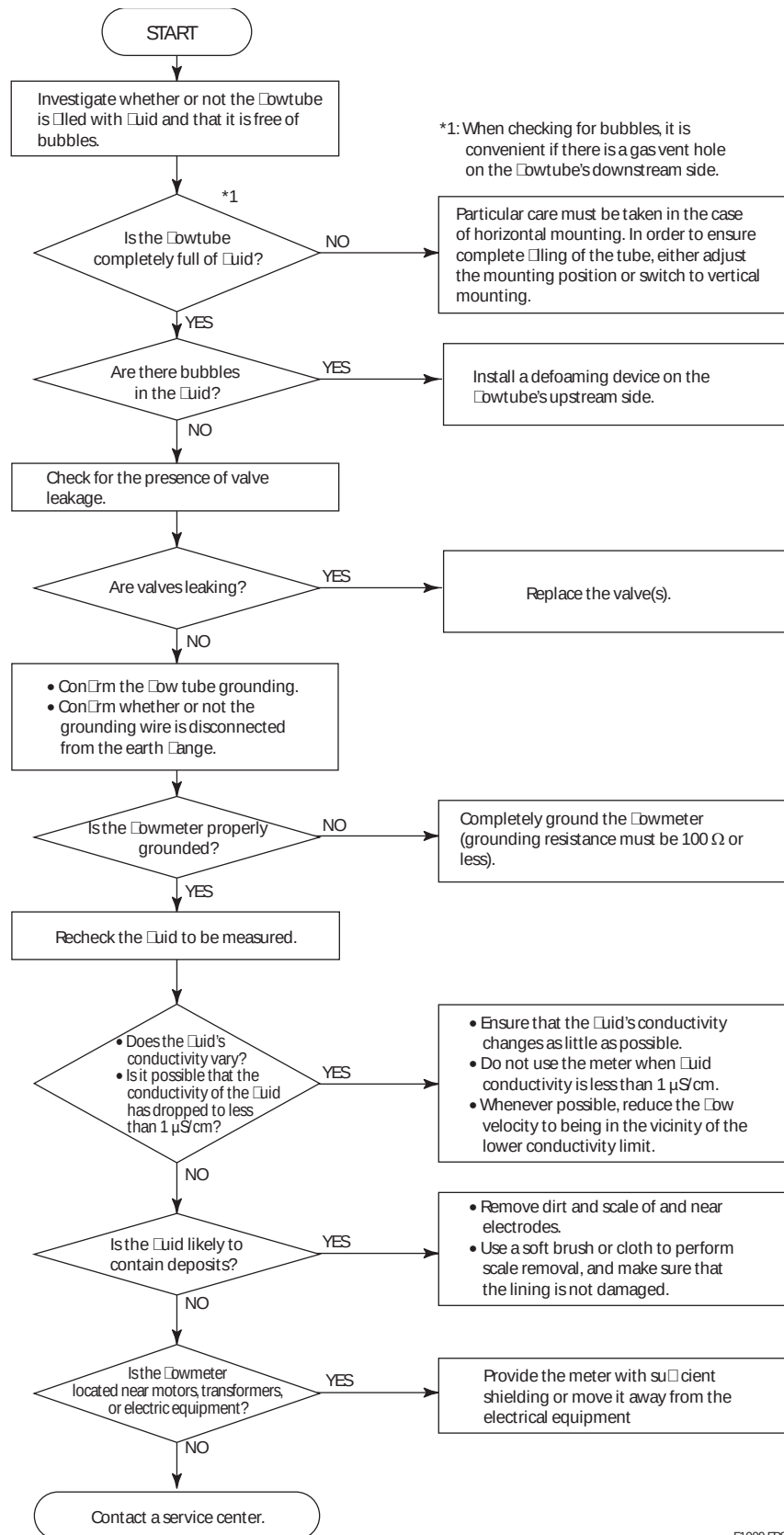
Although magnetic flowmeters rarely require maintenance, failures may occur when the instrument is not operated correctly. This section describes troubleshooting procedures where the cause of the breakdown is identified through receiver indication.

### 10.3.1 No Indication



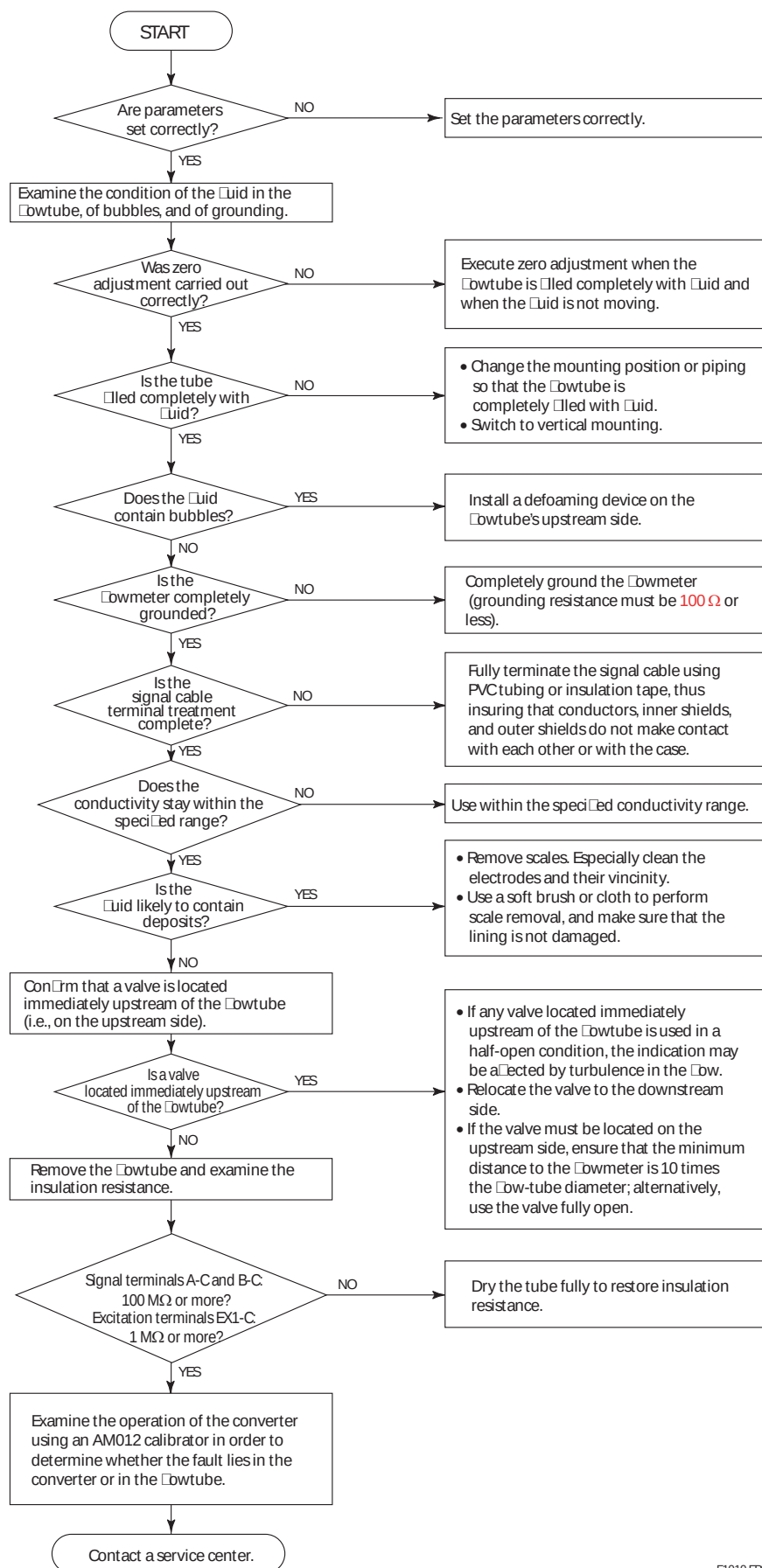
F1008.EPS

## 10.3.2 Unstable Zero



FL009.EPS

### 10.3.3 Disagreement Between Indication and Actual Flow



F1010.FPS



# 11. OUTLINE

## STANDARD SPECIFICATIONS

Refer to GS 01E20F02-01E for Fieldbus communication type marked with “⊗”

### Excitation Method

- Standard dual frequency excitation:  
Size 2.5 to 400 mm (0.1 to 16 in)  
Combined with AXF Remote Flowtube
- Enhanced dual frequency excitation:  
Size 25 to 200 mm (1.0 to 8.0 in)  
Combined with AXF Remote Flowtube  
(for optional code HF1 or HF2)

### Input Signal: “⊗”

One Status Input: Dry contact  
Load resistance: 200 Ω or less (ON), 100 kΩ or more (OFF). (\*1)

### Output Signals: “⊗”

- One Current Output: 4 to 20 mA DC (load resistance: 0 to 750 Ω maximum, including cable resistance)
- One Pulse Output (\*1):  
Transistor contact output (open collector):  
Contact capacity 30 V DC (OFF), 200 mA (ON)  
Output rate 0.0001 to 10,000 pps (pulse/s)
- One Alarm Output (\*1):  
Transistor contact output (open collector):  
Contact capacity 30 V DC (OFF), 200 mA (ON)
- Two Status Outputs (\*1):  
Transistor contact output (open collector):  
Contact capacity 30 V DC (OFF), 200 mA (ON)

### Communication protocols: “⊗”

BRAIN or HART communication signal (Superimposed on the 4 to 20 mA DC signal)  
Distance from power line: 15 cm (6 in) or more. Parallel wiring should be avoided.

### BRAIN:

Communication Distance:  
Up to 2 km (1.25 miles), when polyethylene insulated PVC-sheathed cables (CEV cables) are used.  
Communication distance varies depending on the type of cable and wiring used.

Load resistance: 250 to 600 Ω (incl. cable resistance)

Load Capacitance: 0.22 μF or less

Load Inductance: 3.3 mH or less

Input Impedance of Communicating Device:  
10 kΩ or more (at 24 kHz)

### HART:

Communication Distance:  
Up to 1.5 km (0.9 mile), when using multiple twisted pair cables. Communication distance varies depending on the type of cable used.

Load resistance: 230 to 600 Ω (incl. cable resistance)

Cable Length for Specific Applications:

Use the following formula to determine the cable length for specific applications:

$$L = \frac{65 \times 10^6}{(R \times C)} - \frac{(C_f + 10,000)}{C}$$

where:

L = length in m or ft

R = resistance in Ω (including barrier resistance)

C = cable capacitance in pF/m or pF/ft

C<sub>f</sub> = maximum shunt capacitance of receiving devices in pF/m or pF/ft

Note: HART is a registered trademark of the HART Communication Foundation.

### Data Security During Power Failure:

Data (parameters, totalizer value, etc.) storage by EEPROM. No back-up battery required.

### Indicator:

Full dot-matrix LCD (32x132 pixels) (\*2)

### Lightning Protector: “⊗”

The lightning protector is built into the excitation current output, the current output, the signal common, pulse/alarm/status input and output terminals as standard. If optional code /A is selected, an additional lightning protector is built into the power terminals.

### Protection/Rating:

General-purpose Use/Sanitary Type:

IP66, IP67

Explosion proof type:

In case of explosion proof type, refer to description of “Enclosure” in “HAZARDOUS AREA CLASSIFICATION”.

### Coating/Paint:

Case and Cover: Polyurethane corrosion-resistant  
Coating Color: Mint green (Munsell 5.6 BG 3.3/2.9 or its equivalent)

### Converter Housing Material:

Case and Cover: Aluminum alloy

### Wiring Port Threads/Mounting:

- Electrical Connection: ANSI 1/2 NPT female  
ISO M20 x 1.5 female
- Terminal Connection: M4 size screw terminal

### Grounding:

Grounding resistance 100 Ω or less

When option code /A is selected, Class C grounding (grounding resistance 10 Ω or less) shall be applied. In case of explosion proof type, follow the domestic electrical requirements as regulated in each country.

\*1: Select one of the following 3 choices:

- 1 Pulse output, 1 Status/Alarm output
- 1 Status/Alarm output, 1 Status input
- 2 Status/Alarm outputs

\*2: For models without an indicator, a hand-held terminal is necessary to set parameters.

## 11. OUTLINE

### Combined Remote Flowtube:

- AXFA14 Converter can be combined with size 2.5 to 400 mm (0.1 to 16 in) of AXF Remote Flowtube.
- If a combined converter is changed from AXFA14 to AXFA11 or vice versa, a new meter factor must be adjusted by flow calibrations.
- In case that size 250 mm (10 in) or larger is used in low conductivity or high concentration slurries, please use the AXFA11 Converter.

## FUNCTIONS “⊗”

### How to Set Parameters:

The indicator's LCD and three infra-red switches enables the user to set parameters without opening the cover. Parameters can also be set by means of the HHT (Handheld terminal). (\*2)

### Displayed Languages:

Users can choose one of the following languages : English, French, German, Italian, Japanese or Spanish. (\*2)

### Instantaneous Flow Rate/Totalized Value Display Functions (for models with an indicator):

The full dot-matrix LCD enables user selections of displays from one line to three lines for:

- Instantaneous flow rate
- Instantaneous flow rate (%)
- Instantaneous flow rate (bar graph)
- Current output value (mA)
- Totalized value
- TagNo.
- Results of electrode adhesion diagnostics (\*2)

### Totalizer Display Function:

The flow rate is counted one step at a time according to the setting of totalization pulse weights. For forward and reverse flow measurement functions, the totalized values of the flow direction (forward or reverse) and the flow rate are displayed on the indicator together with the units. The difference values between the totalized forward and reverse flow can also be displayed. Totalization for the reverse flow rate is carried out only when “Forward and reverse flow measurement function” is selected. (\*2)

### Damping Time Constant:

Time constant can be set from 0.1 s to 200.0 s (63 % response). (\*2)

### Span Setting Function:

Span flows can be programmed in units such as volume flow rate, mass flow rate, time, or flow rate value. The velocity unit can also be set. (\*2)

Volume Flow Rate Unit: kcf, cf, mcf, Mgal (US), kgal (US), gal (US), mgal (US), kbbl (US)\*, bbl (US)\*, mbbl (US)\*, μbbl (US)\*, MI (megaliter), m<sup>3</sup>, kl (kiloliter), l (liter), cm<sup>3</sup>

Mass Flow Rate Unit (Density must be set):

lb (US-pound), klb (US), t (ton), kg, g

Velocity Unit: ft, m (meter)

Time Unit: s (sec), min, h (hour), d (day)

\* “US oil” or “US beer” can be selected.

The converter will provide 20mA output current at the programmed span/full scale flow range.

### Pulse Output:

Scaled pulses can be generated by setting a pulse weight.

Pulse Width: Duty cycle 50 % or fixed pulse

width (0.05, 0.1, 0.5, 1, 20

100 ms) can be selected arbitrarily.

Output Rate: 0.0001 to 10,000 pps (pulse/s) (\*1)

### Multi Range/Auto Range Span Function:

- Range switching via status input  
Status input enables the switching of up to two ranges.
- Automatic range switching  
When the flow rate exceeds 100 % of the range, transition to the next range (up to four ranges) is carried out automatically. Range switching can be confirmed by status outputs and indicator. (\*1)(\*2)

### Fwd/Rev Flow Measurement Functions:

Flows in both forward and reverse directions can be measured. The status is shown in status outputs and on the indicator during the reverse flow measurement. (\*1)(\*2)

### Totalization Switch:

The status output is carried out if a totalized value becomes equal or greater than the set value. (\*1)

### Preset Totalization:

The parameter setting or status input enables a totalized value to be preset to a setting value or zero. (\*1)

### Positive Zero Return (PZR/0 % Signal Lock):

Status input forcibly fixes the instantaneous flow rate display, current output, pulse output, and flow rate totalization to 0 %. (\*1)(\*2)

### Alarm Selection Function:

Alarms are classified into System Alarms (hard failures), Process Alarms (such as ‘Empty Pipe’, ‘Signal Overflow’ and ‘Adhesion Alarm’), Setting Alarms, and Warnings. Whether alarms should be generated or not can be selected for each item. The current output generated for an alarm can be selected arbitrarily from among 2.4 mA or less, fixed to 4 mA, 21.6 mA or more, or HOLD. (\*2)

### Alarm Output:

Alarms are generated only for the items selected via the ‘Alarm Selection Function’ if relevant failures occur. (\*1)

### Self Diagnostic Functions:

If alarms are generated, details of the System Alarms, Process Alarms, Setting Alarms and Warnings are displayed together with concrete descriptions of countermeasures. (\*2)

\*1: Select one of the following 3 choices:

- 1 Pulse output , 1 Status/Alarm output
- 1 Status/Alarm output, 1 Status input
- 2 Status/Alarm outputs

\*2: For models without an indicator, a hand-held terminal is necessary to set parameters.

**Flow Upper/Lower Limit Alarms:**

If a flow rate becomes greater or smaller than the set value, this alarm is generated. In addition, two upper limits (H, HH) and two lower limits (L, LL) can be set.  
If a flow rate gets higher or lower than any of the set values, the status is output. (\*1)

**Adhesion (Electrode Coating) Diagnostics Function:**

This function enables monitoring of the adhesion level of insulating substances to the electrodes. Depending on the status of adhesion, users are notified by a warning or an alarm via status outputs. If replaceable electrodes are used, they can be removed and cleaned when adhesion occurs. (\*1) (\*2)

**HAZARDOUS AREA CLASSIFICATION****CENELEC ATEX (KEMA):**

Applicable Standard: EN 50014, EN 50018,  
EN 50281-1-1, EN 60529,  
EN 61010-1

Certificate: KEMA 03ATEX2435

**CENELEC ATEX (KEMA) Flame proof Type**

Group Category II 2G

EExd IIC T6

Maximum power supply voltage: 250 V AC/130 V DC

Excitation circuit: 140 V max

Enclosure: IP67, IP66

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

**CENELEC ATEX (KEMA) Type of Protection "Dust"**

Group Category II 1D

Maximum power supply voltage: 250 V AC/130 V DC

Excitation Circuit: 140 V max

Enclosure: IP66, IP67

Maximum surface temperature T75 °C (+167 °F)

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

**FM:**

Applicable Standard: FM3600, FM3615, FM3810,  
ANSI/NEMA 250

Explosion proof for Class I, Division 1, Groups A, B, C & D  
Dust-ignition proof for Class II/III, Division 1, Groups E, F & G

"SEAL ALL CONDUITS WITHIN 18 INCHES"

"WHEN INSTALLED IN DIV.2, SEALS NOT REQUIRED"

Maximum power supply voltage: 250 V AC/130 V DC

Excitation circuit: 140 V max

Enclosure: NEMA 4X

Temp. Code: T6

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

Note: Installation shall be in accordance with the manufacturer's instructions and National Electric code, ANSI/NFPA-70.

**CSA:**

Applicable Standard:

For CSA C22.2 Series;

C22.2 No 0, C22.2 No 0.4, C22.2 No 0.5,  
C22.2 No 25, C22.2 No 30, C22.2 No 94,  
C22.2 No 1010.1

For CSA E79 Series;

CAN/CSA-E79-0, CAN/CSA-E79-1,

Certificate: 1481213

**For CSA C22.2 Series**

Explosion proof Class I, Division 1, Groups A, B, C & D.

Dust-ignition proof Class II/III, Division 1, Groups E, F & G.

"SEAL ALL CONDUITS WITHIN 50 cm of the enclosure"

"WHEN INSTALLED IN DIV.2, SEALS NOT REQUIRED"

Maximum power supply voltage: 250 V AC/130 V DC

Excitation Circuit: 140 V max

Enclosure: Type 4X

Temperature Code: T6

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

**For CSA E79 Series**

Maximum power supply voltage: 250 V AC/130 V DC

Flame proof zone 1, Ex dme [ia] IIC T6

Excitation circuit: 140 V max

Enclosure Type: NEMA 4X, IP66, IP67

Temp. Code: T6

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

**IECEx:**

Applicable Standard:

IEC 60079-0:2004,

IEC 60079-1:2003,

IEC 61241-0:2004,

IEC 61241-1:2004,

IEC 60529:1999 + Edition 2.1:2001

Certificate: IECEx KEM 05.0018

**IECEx Flameproof Type**

Exd IIC T6

Maximum power supply voltage: 250 V AC/130 V DC

Excitation Circuit: 140 V max

Enclosure: IP66, IP67

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

**IECEx Type of Protection "Dust"**

Ex tDA21 IP6x T95 °C

Maximum power supply voltage: 250 V AC/130 V DC

Excitation Circuit: 140 V max

Enclosure: IP66, IP67

Maximum surface temperature: T95 °C (+203 °F)

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

## STANDARD PERFORMANCE

### Reference Conditions:

Similar to BS EN 29104 (1993); ISO 9104 (1991)

- Fluid temperature:  $20^{\circ}\text{C} \pm 10^{\circ}\text{C}$  ( $+68^{\circ}\text{F} \pm 18^{\circ}\text{F}$ )
- Ambient temperature:  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ( $+77^{\circ}\text{F} \pm 9^{\circ}\text{F}$ )
- Warm-up time: 30 min
- Straight runs
  - Upstream  $> 10 \times \text{DN}$
  - Downstream  $> 5 \times \text{DN}$
- Properly grounded
- Properly centered

### Accuracy (Combined with AXF Remote Flowtube at reference conditions)

#### Pulse Output Accuracy:

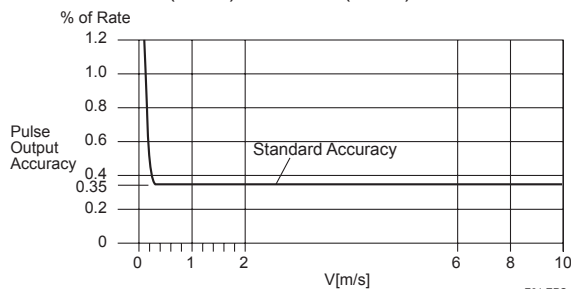
##### PFA/Ceramics Lining:

| Size mm (in)          | Flow Velocity V m/s (ft/s)                           | Standard Accuracy (Calibration code B) | Flow Velocity V m/s (ft/s)                                              | High grade Accuracy (Calibration code C)                   |
|-----------------------|------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------|
| 2.5 (0.1) to 15 (0.5) | $V < 0.3$ (1)<br>$0.3 \leq V \leq 10$ (1) (33)       | $\pm 1.0$ mm/s<br>$\pm 0.35$ % of Rate | —                                                                       |                                                            |
| 25 (1.0) to 200 (8.0) | $V < 0.15$ (0.5)<br>$0.15 \leq V \leq 10$ (0.5) (33) | $\pm 0.5$ mm/s<br>$\pm 0.35$ % of Rate | $V < 0.15$ (0.5)<br>$0.15 \leq V < 1$ (0.5) (3.3)<br>$1 \leq V \leq 10$ | $\pm 0.5$ mm/s<br>$\pm 0.18$ % of Rate +<br>$\pm 0.2$ % of |
| 250 (10) to 400 (16)  | $V < 0.15$ (0.5)<br>$0.15 \leq V \leq 10$ (0.5) (33) | $\pm 0.5$ mm/s<br>$\pm 0.35$ % of Rate | —                                                                       |                                                            |

T01.EPS

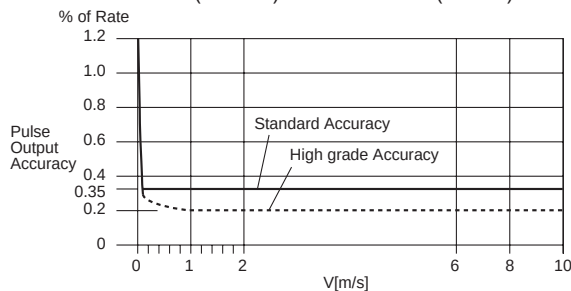
Enhanced dual frequency excitation (Option code HF2): Standard accuracy  $\pm 1$  mm/s

Size 2.5 mm (0.1 in) to 15 mm (0.5 in)



F01.EPS

Size 25 mm (1.0 in) to 400 mm (16 in)



F02.EPS

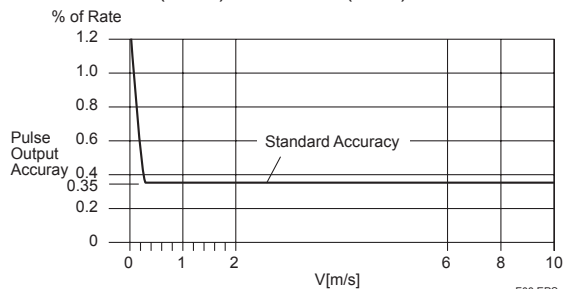
Polyurethane Rubber/Natural Soft Rubber/EPDM Rubber Lining:

| Size mm (in)         | Flow Velocity V m/s (ft/s)                         | Standard Accuracy (Calibration code B) |
|----------------------|----------------------------------------------------|----------------------------------------|
| 25 (1.0) to 400 (16) | $V < 0.3$ (1.0)<br>$0.3 \leq V \leq 10$ (1.0) (33) | $\pm 1.0$ mm/s<br>$\pm 0.35$ % of Rate |

T02.EPS

Enhanced dual frequency excitation (Optional code HF2): Standard accuracy  $\pm 1$  mm/s

Size 25 mm (1.0 in) to 400 mm (16 in)



F03.EPS

#### Current Output Accuracy: "⊗"

Pulse output accuracy plus 0.05 % of Span

#### Repeatability:

0.1 % of Rate ( $V \geq 1$  m/s (3.3 ft/s))

0.05 % of Rate + 0.5 mm/s ( $V < 1$  m/s (3.3 ft/s))

#### Maximum Power Consumption:

Combined with AXF Remote Flowtube: 12 W

#### Insulation Resistance (Performance/Requirements):

Between power supply terminals and ground

terminal: 100 MΩ at 500 V DC

Between power supply terminals and input/output/ excitation current terminals: 100 MΩ at 500 V DC

Between ground terminal and input/output/ excitation current terminals: 20 MΩ at 100 V DC

Between input/output/excitation current terminals: 20 MΩ at 100 V DC (\*1)

#### Withstand Voltage performance:

Between power supply terminals and ground terminal: 1390 V AC for 2 s

Between power supply terminals and input/output terminals: 1390 V AC for 2 s

Between excitation current terminal and ground terminal: 160 V AC for 2 s

Between excitation current terminal and input/output terminals: 200 V AC for 2 s (\*1)



#### CAUTION

- When performing the Insulation Resistance Test or the Withstand Voltage Test, please obey the following caution.
- Following the relevant test, wait for more than 10 s after the power supply has been turned off before removing the cover.
- Remove all wires from terminals before testing.
- When the power terminal has a lighting protector

(optional code A), remove the short bar at the ground terminal.

- After testing, be sure to discharge by using a resistor and return all wires and the short bar to its correct position.
- Screws must be tightened to a torque of 1.18 Nm or more.
- After closing the cover, the power supply can be restored.

#### Safety Requirement Standards:

EN 61010

- Altitude at installation site: Max. 2000 m above sea level
- Installation category based on IEC 1010: Overvoltage category II ("II" applies to electrical equipment which is supplied from a fixed installation-like distribution board.)
- Pollution degree based on IEC 1010: Pollution degree 2 ("Pollution degree" describes the degree to which a solid, liquid or gas which deteriorates dielectric strength or surface resistivity is adhering. "2" applies to a normal indoor atmosphere.)

#### EMC Conformity Standards:

EN 61326

EN61000-3-2, EN61000-3-3

AS/NZSCISPR11

## NORMAL OPERATING CONDITIONS

#### Ambient Temp.:

-40 °C to 60 °C (-40 °F to +140 °F)

- Indicator's operating range:  
-20 °C to 60 °C (-5 °F to +140 °F)
- Maximum temperature should be 50 °C in case of Power Supply Suffix Code 2.

#### Ambient Humidity: 0 to 100 %

Lengthy continuous operation at 95 % or more is not recommended.

#### Power Supply

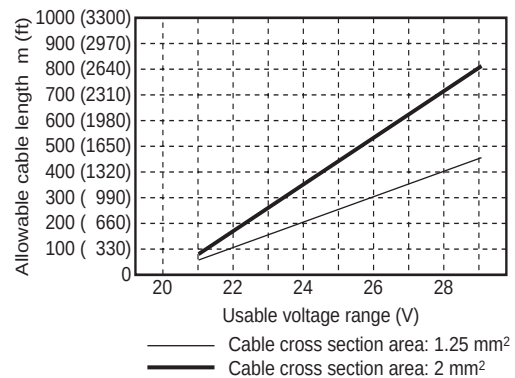
Power supply suffix code 1:

- AC specifications  
Rated power supply: 100 to 240 V AC, 50/60 Hz  
(Operating voltage range: 80 to 264 V AC)
- DC specifications  
Rated power supply: 100 to 120 V DC  
(Operating voltage range: 90 to 130 V DC)

Power supply suffix code 2:

- AC specifications  
Rated power supply: 24 V AC, 50/60 Hz  
(Operating voltage range: 20.4 to 28.8 V AC)
- DC specifications  
Rated power supply: 24 V DC  
(Operating voltage range: 20.4 to 28.8 VDC)

Supplied Power and  
Cable Length for Power Supply Code 2



F04.EPS

#### Vibration Conditions:

Level of vibration in conformity with IEC 60068-2-6 (SAMA31. 1-1980)

1 G or less (frequency 500 Hz or less)

Note: Avoid locations with much vibration (with a vibration frequency of 500 Hz or more), which may cause damage to the equipment.

## ACCESSORIES

Fuse Time lag (T2.5A, 250 V): 1 pc.

Mounting bracket: 1 set

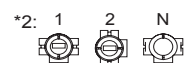
Hexagonal wrench: 1 pc.

## MODEL AND SUFFIX CODE

#### AXFA14 Magnetic Flowmeter Converter for Remote Flowtube:

| Model                                       | Suffix Code | Description                                                                         |
|---------------------------------------------|-------------|-------------------------------------------------------------------------------------|
| AXFA14                                      |             | Magnetic Flowmeter Converter                                                        |
| Use (*1)                                    | G .....     | General-Purpose Use<br>For AXF Remote Flowtube of Size 2.5 to 400 mm (0.1 to 16 in) |
|                                             | C .....     | Explosion proof type<br>For Remote Flowtube of size 2.5 to 400 mm (0.1 to 16 in)    |
| Output Signal and Communication             | -D .....    | 4 to 20 mA DC, BRAIN Communication                                                  |
|                                             | -E .....    | 4 to 20 mA DC, HART Communication                                                   |
|                                             | -F .....    | Digital communication<br>(FOUNDATION Fieldbus protocol (*3))                        |
| Power Supply                                | 1 .....     | 100 V to 240 V AC or 100 to 120 V DC                                                |
|                                             | 2 .....     | 24 V AC/DC                                                                          |
| Electrical Connections wiring port / thread | -2 .....    | ANSI 1/2 NPT female                                                                 |
|                                             | -4 .....    | ISO M20 x 1.5 female                                                                |
| Indicator (*2)                              | 1 ....      | With Indicator (horizontal)                                                         |
|                                             | 2 ....      | With Indicator (vertical)                                                           |
|                                             | N ....      | None                                                                                |
| Option                                      | / ■         | Optional code (See the Table of Optional Specifications)                            |

\*1: ANSI 1/2/NPT and ISO M20x1.5 electrical connections are available for ATEX, FM or CSA explosion proof type.



\*3: For FOUNDATION Fieldbus protocol, refer to GS 01E20F02-01E

T03.EPS

Signal Cable: (\*1)

| Model        | Suffix Code | Description                                                                                                                                                                                                                                                                                          |
|--------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AXFC         | .....       | Magnetic Flowmeter<br>Dedicated Signal cable for the ADMAG AXF series                                                                                                                                                                                                                                |
| Termination  | -0 .....    | No Termination.                                                                                                                                                                                                                                                                                      |
|              | -4 .....    | A set of termination parts for M4 screws is attached.<br>Terminated for the AXFA11/14 Converter.                                                                                                                                                                                                     |
| Cable Length | -L ■■■...   | Designate the cable length, unit: m<br>Following "L", specify the cable in three digits<br>(e.g. 002, or 005) for a length up to 5 m, or as a<br>multiple of 5 m (i.e. 005, 010, 015, ...).<br>The maximum cable length:<br>200 m for combined use with AXFA11<br>100 m for combined use with AXFA14 |
|              | /C ■        | With termination parts sets.<br>Following "C", specify the q'ty of sets of<br>termination parts in one digits.                                                                                                                                                                                       |

T04.EPS

\*1: Unnecessary to order the above cable for submersible style flowtube AXF□□□W-Por for the optional code /DHC flowtube because the flowtube is wired with 30 m (98 ft) cable. For other lengths than 30 m (Std. length) please specify on remote flowtube option code /L\*\*\*.

Note:

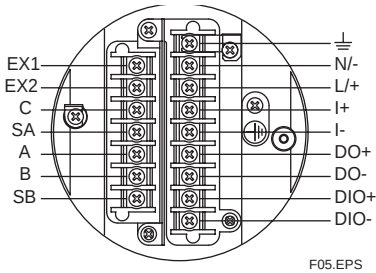
- The cable is constructed with double shielding over the two conductors, and uses heat-resistant vinyl as the outer covering material.  
Finished diameter: 10.5 mm (0.413 in)  
Maximum temperature: 80 °C (175 °F)
- For excitation, prepare a two-core cable at the customer side.

Recommended Excitation, Power and Output Cable:

- Use polyvinyl chloride insulated and sheathed control cable (JIS C3401) or Polyvinyl chloride insulated and sheathed portable power cables (JIS C3312) or equivalents.
- Outer Diameter: 6.5 to 12 mm (0.26 to 0.47 in)
  - Nominal Cross Section: 0.5 to 2.5 mm<sup>2</sup>

Please see also cable drawings on page 11-8.

TERMINAL CONFIGURATION “⊗”



F05.EPS

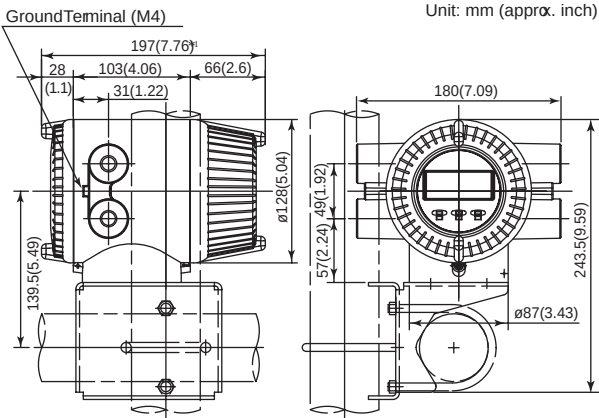
TERMINAL WIRING “⊗”

| Terminal Symbols        | Description               | Terminal Symbols | Description                                       |
|-------------------------|---------------------------|------------------|---------------------------------------------------|
| EX1<br>EX2              | Excitation current Output |                  | Functional grounding                              |
| C<br>SA<br>A<br>B<br>SB |                           | N/-<br>L/+       | Power supply                                      |
|                         | Flow signal input         | I+<br>I-         | Current output<br>4 to 20mA DC                    |
|                         |                           | DO+<br>DO-       | Pulse output/<br>Alarm output/<br>Status output   |
|                         |                           | DIO+<br>DIO-     | Alarm output/<br>Status output/<br>Status input   |
|                         |                           |                  | Protective grounding<br>(Outside of the terminal) |

T06.EPS

EXTERNAL DIMENSIONS

Converter AXFA14



\*No infra-red switches are furnished for Hieldbus communication type.

Weight: 2.8kg (6.2lb)

\*1: When indicat or code N is selected, subtract 12 mm (0.47 inch) from the value in the figure. In case of explosion proof type with indicat or, add 5 mm (0.2 inch) to it. F06.EP

## OPTIONAL SPECIFICATIONS FOR AXFA14 CONVERTER “⊗”

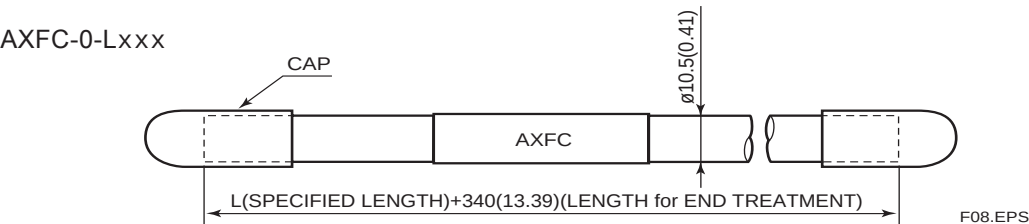
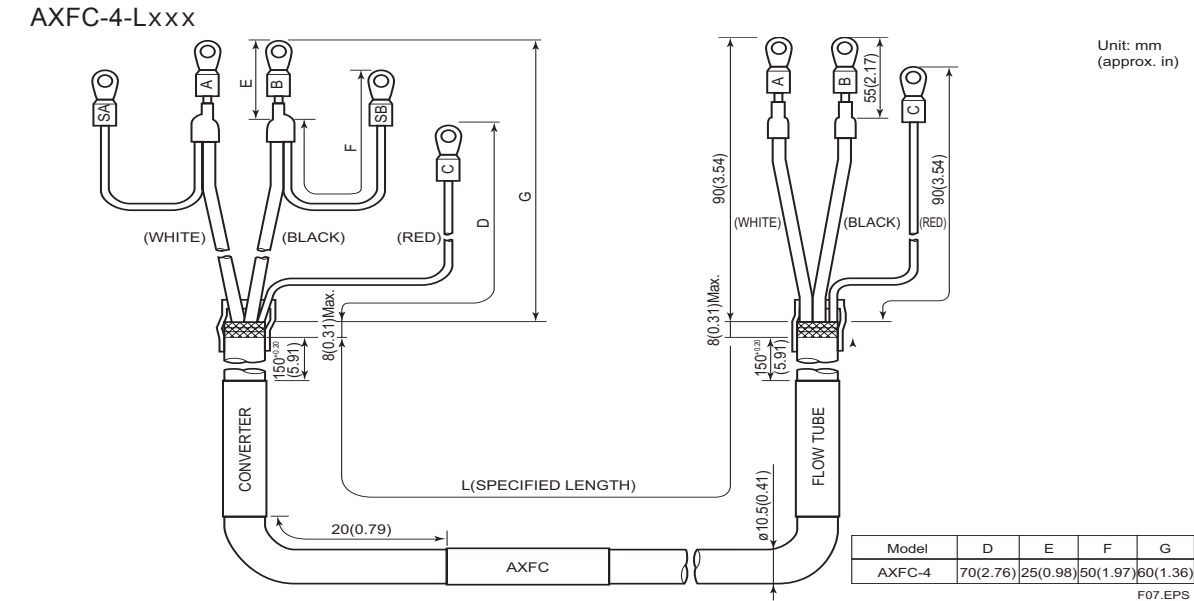
| Item                             | Specification                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                 | General Purpose Use | Explos. proof | Code |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------|---------------|------|
| Lightning Protector              | A lightning protector is built into the power terminals.                                                                                                                                                                                                                                                                                                                                      |                                                                                                 |                     |               | A    |
| DC Noise Cut Circuit             | The DC Noise Cut Circuit is built in. Available for 15 mm (0.5 in) and larger sizes, and for fluids with the conductivity of 50 μS/cm or higher. Nullifies the empty check and electrode adhesion diagnostic function.                                                                                                                                                                        |                                                                                                 | O                   | O             | ELC  |
| Burn Out Down                    | The output level is set to 0 mA during a CPU failure and is set 2.4 mA (-10 %) or less during an alarm. Standard products are delivered with a setting 25 mA during a CPU failure and 21.6 mA (110 %) or more during an alarm.                                                                                                                                                                |                                                                                                 | O                   | O             | C1   |
| NAMUR NE43 Compliant             | Output signal limits: 3.8 to 20.5 mA                                                                                                                                                                                                                                                                                                                                                          | Failure alarm down-scale: Output status at a CPU failure or an alarm is 2.4 mA (-10 %) or less. | O                   | O             | C2   |
|                                  |                                                                                                                                                                                                                                                                                                                                                                                               | Failure alarm up-scale: Output status at a CPU failure or an alarm is 21.6 mA (110 %) or more.  | O                   | O             | C3   |
| Active Pulse Output              | Active pulses are output in order to drive an external electromagnetic or electronic counter directly using the converter's internal power supply. (Nullifies the standard transistor contact pulse output.)<br>Output voltage: 24 V DC ±20 %<br>Pulse specifications:<br>• At the drive current of 30 to 150 mA<br>Pulse rate: 0.0001 to 2 pps (pulse/s); pulse width: 20, 33, 50, or 100 ms |                                                                                                 | O                   | O             | EM   |
| Stainless Steel Mounting Bracket | Provided with a JIS SUS304 (AISI 304 SS/EN 1.4301 equivalent) stainless steel mounting bracket in lieu of the standard carbon steel bracket.                                                                                                                                                                                                                                                  |                                                                                                 | O                   | O             | SB   |
| Stainless Steel Tag Plate        | Screwed JIS SUS304 (AISI 304 SS/EN 1.4301 equivalent) stainless steel tag plate. Choose this option when an SS tag plate is required in addition to the standard nameplate with the tag number inscribed on it.<br>Dimensions: (Height x Width) : Appr.12.5 (4.92) x 40 (15.7) mm (in)                                                                                                        |                                                                                                 | O                   | O             | SCT  |
| Epoxy Resin Coating              | Epoxy resin coating instead of standard polyurethane resin coating. The color is same as standard type.                                                                                                                                                                                                                                                                                       |                                                                                                 | O                   | O             | X1   |
| High Anti-corrosion Coating      | Three-layer coating (urethane coating on two-layer epoxy resin coating) in the same range as that for the standard coating. The color is same as standard type.<br>Salt/alkali/acid/weather-resistance.                                                                                                                                                                                       |                                                                                                 | O                   | O             | X2   |
| FM Approval                      | Explosion proof for Class I, Division 1, Groups A, B, C & D<br>Dust-ignition proof for Class II / III, Division 1, Groups E, F & G<br>Temp. Code: T6 ; Enclosure : NEMA 4X<br>See "HAZARDOUS AREA CLASSIFICATION"                                                                                                                                                                             |                                                                                                 | ---                 | O             | FF1  |
| ATEX (KEMA) Certification        | Group II, Category 1D/2G, EEx d II C T6<br>Ambient temperature: -40 °C to 60 °C (-40 °F to 140 °F)<br>Enclosure: IP67<br>See "HAZARDOUS AREA CLASSIFICATION"                                                                                                                                                                                                                                  |                                                                                                 | ---                 | O             | KF2  |
| CSA Certification                | Explosion proof for Class I, Division 1, Groups A, B, C & D<br>Dust-ignition proof for Class II / III, Division 1, Groups E, F & G<br>Temp Code: T6; Enclosure: NEMA 4X<br>Ambient temperature: -40 °C to 60 °C (-40 °F to 140 °F)<br>See "HAZARDOUS AREA CLASSIFICATION"                                                                                                                     |                                                                                                 | ---                 | O             | CF1  |
| IECEX Certification *1           | IECEX Explosion proof<br>See "HAZARDOUS AREA CLASSIFICATION"                                                                                                                                                                                                                                                                                                                                  |                                                                                                 | ---                 | O             | SF2  |
| Calibration Certificate          | Level 2: The Declaration and the Calibration Equipment List are issued.                                                                                                                                                                                                                                                                                                                       |                                                                                                 | O                   | O             | L2   |
|                                  | Level 3: The Declaration and the Primary Standard List are issued.                                                                                                                                                                                                                                                                                                                            |                                                                                                 | O                   | O             | L3   |
|                                  | Level 4: The Declaration and the Yokogawa Measuring Instruments Control System are issued.                                                                                                                                                                                                                                                                                                    |                                                                                                 | O                   | O             | L4   |

\*1 Available only for Australia and New Zealand area

T05.EPS

EXTERNAL DIMENSIONS

Dedicated Signal Cable



Unless otherwise specified, difference in the dimensions are referred to the foollowing table :

General tolerance in the dimensional outline drawing.

Unit : mm (approx.inch)

| Category of basic dimension |                |               | Category of basic dimension |                |               |
|-----------------------------|----------------|---------------|-----------------------------|----------------|---------------|
| Above                       | Equal or below | Tolerance     | Above                       | Equal or below | Tolerance     |
|                             | 3 (0.12)       | ±0.7 (60.03)  | 500 (19.69)                 | 630 (24.80)    | ±5.5 (62.17)  |
| 3 (0.12)                    | 6 (0.24)       | ±0.9 (60.04)  | 630 (24.80)                 | 800 (31.50)    | ±6.25 (60.25) |
| 6 (0.24)                    | 10 (0.39)      | ±1.1 (60.04)  | 800 (31.50)                 | 1000 (39.37)   | ±7.0 (60.28)  |
| 10 (0.39)                   | 18 (0.71)      | ±1.35 (60.05) | 1000 (39.37)                | 1250 (49.21)   | ±8.25 (60.32) |
| 18 (0.71)                   | 30 (1.18)      | ±1.65 (60.06) | 1250 (49.21)                | 1600 (62.99)   | ±9.75 (60.38) |
| 30 (1.18)                   | 50 (1.97)      | ±1.95 (60.08) | 1600 (62.99)                | 2000 (78.74)   | ±11.5 (60.45) |
| 50 (1.97)                   | 80 (3.15)      | ±2.3 (60.09)  | 2000 (78.74)                | 2500 (98.43)   | ±14.0 (60.55) |
| 80 (3.15)                   | 120 (4.72)     | ±2.7 (60.11)  | 2500 (98.43)                | 3150 (124.02)  | ±16.5 (60.65) |
| 120 (4.72)                  | 180 (7.09)     | ±3.15 (60.12) |                             |                |               |
| 180 (7.09)                  | 250 (9.84)     | ±3.6 (60.14)  |                             |                |               |
| 250 (9.84)                  | 315 (12.40)    | ±4.05 (60.16) |                             |                |               |
| 315 (12.40)                 | 400 (15.75)    | ±4.45 (60.18) |                             |                |               |
| 400 (15.75)                 | 500 (19.69)    | ±4.85 (60.19) |                             |                |               |

Remarks: The numeric is based on criteria of tolerance class IT18 in JIS B 0401.

# 12. HAZARDOUS DUTY TYPE INSTRUMENTS

In this section, further requirements and differences for explosion proof type instrument are described.



## WARNING

- Magnetic flowmeters with the model name AXFA14C are products which have been certified as explosion proof type instruments. Strict limitations are applied to the structures, installation locations, external wiring work, maintenance and repairs, etc. of these instruments. Sufficient care must be taken, as any violation of the limitations may cause dangerous situations. Be sure to read this chapter before handling the instruments.

For explosion proof type instrument, the description in this chapter is prior to other description in this user's manual.

For TIIS flameproof type instruments, be sure to read "INSTALLATION AND OPERATING PRECAUTIONS FOR TIIS FLAMEPROOF EQUIPMENT" at the end of this manual.



## WARNING

The terminal box cover and display cover is locked by special screw. In case of opening the cover, please use the hexagonal wrench attached.

The covers of explosion proof type products are locked. Use the attached hexagonal wrench to open and close the cover. Before opening the cover, be sure to check that the power of flowmeter has been turned off. Once the cover is closed, be sure to re-lock the product. Be sure to lock the cover with the special screw using the hexagonal wrench attached after tightening the cover.

## 12.1 ATEX (KEMA)



## WARNING

Only trained persons use this instrument in industrial locations.

### (1) Technical Data

#### Applicable Standard:

EN 50014, EN 50018, EN 50281-1-1,  
EN 60529, EN 61010-1

Certificate: KEMA 03ATEX2435

#### CENELEC ATEX (KEMA) Flameproof Type

Group: II

Category: 2G

EEx d IIC T6

Maximum power supply voltage: 250 VAC/130 VDC

Excitation Circuit: 140 V max

Enclosure: IP66, IP67

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

#### CENELEC ATEX (KEMA) Type of Protection "Dust"

Group: II

Category: 1D

Maximum power supply voltage: 250 VAC/130 VDC

Excitation Circuit: 140 V max

Enclosure: IP66, IP67

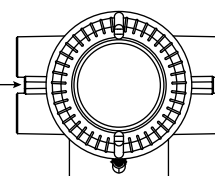
Maximum surface temperature: T75 °C (+167 °F)

Ambient Temp.: -40 °C to +60 °C (-40 °F to +140 °F)

### (2) Electrical Connection

The type of electrical connection is stamped near the electrical connection port according to the following codes.

| Screw Size         | Marking |
|--------------------|---------|
| ISO M20x1.5 female | △ M     |
| ANSI 1/2NPT female | △ A     |



F1201.EPS

## 12. HAZARDOUS DUTY TYPE INSTRUMENTS

### (3) Installation



#### WARNING

- All wiring shall comply with local installation requirements and local electrical code.
- In hazardous locations, the cable entry devices shall be of a certified ATEX flame proof type, suitable for the conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flame proof certified blanking elements. (The plug attached is flame proof certified.)

### (4) Operation



#### WARNING

- After de-energizing, delay 20 min before opening.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

### (5) Maintenance and Repair



#### WARNING

The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the certification.

### (6) Data Plate

|                                                                                                                                                                 |         |                           |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------------------|----|
| <b>ADMAG AXF</b> MAGNETIC FLOWMETER                                                                                                                             |         | <b>OUTPUT</b> mA (0-750 ) |    |
|                                                                                                                                                                 |         | VDC 0.2A MAX.             |    |
| <b>MODEL</b>                                                                                                                                                    |         | <b>AMB. TEMP.</b>         | °C |
| <b>SUFFIX</b>                                                                                                                                                   |         | <b>TAG NO.</b>            |    |
|                                                                                                                                                                 |         | <b>NO.</b>                |    |
| <b>STYLE</b>                                                                                                                                                    |         | <b>COMB. NO.</b>          |    |
| <b>SUPPLY</b>                                                                                                                                                   | VDC 12W |                           |    |
| VAC 50/60Hz 30VA 12W                                                                                                                                            |         |                           |    |
| <b>I2G</b><br><b>I1D</b>                                                                                                                                        |         |                           |    |
| No.: KEMA 03ATEX2435<br>EEx dII C T6<br>ENCLOSURE: IP66, IP67<br>Tamb: -40 TO +60 C<br>MAX. SURFACE TEMP.: T75 C<br>FOR DUST-PROOF<br>⚠ WARNING → User's Manual |         |                           |    |
| YOKOGAWA ♦ Made in _____                                                                                                                                        |         | TOKYO 180-8750 JAPAN      |    |

MODEL : Specified model code  
 SUFFIX : Suffix codes of the model code  
 STYLE : Specified style code  
 SUPPLY : Power supply voltage of apparatus  
 OUTPUT : Output signal of apparatus  
 AMB. TEMP : Ambient temperature  
 No. : Manufacturing serial number \*1)  
 CE : CE marking  
 I2G : Group II Category 2 Gas atmosphere  
 I1D : Group II Category 1 Dust atmosphere  
 No. : KEMA 03ATEX2435  
 EC Type Examination certificate number  
 EEx d IIC T6 : Protection type and temp. class  
 ENCLOSURE : Enclosure protection code



**WARNING:** Warning to apparatus

YOKOGAWA TOKYO 180-8750 JAPAN :  
Name and address of manufacturer

\*1) The third figure from the last shows the last one figure of the year of production. For example, the year of production of the product engraved as follows is year 2003.

No. F261GA091 313



Produced in 2003

or

the data plate indicates in a separate field "Produced 20□□"

\*2) The identification number of the notified body: 0344 KEMA Netherland

\*3) The product-producing country

## 12.2 FM

### (1) Technical Data

Applicable Standard:

FM3600, FM3615, FM3810, ANSI/NEMA 250

Explosion proof for Class I, Division 1,  
Groups A, B, C & D.

Dust-ignition proof for Class II/III, Division 1,  
Groups E, F & G.

“SEAL ALL CONDUITS WITHIN 18 INCHES”

“WHEN INSTALLED IN DIV. 2, SEALS NOT  
REQUIRED”

Maximum power supply voltage: 250 VAC/130 VDC

Excitation Circuit: 140 V max

Enclosure: NEMA 4X

Temperature Code: T6

Ambient Temp.: -40 °C to +60 °C (-40 °F to  
+140 °F)

### (2) Installation



#### WARNING

- All wiring shall comply with National Electrical Code ANSI/NFPA 70 and Local Electrical Code.
- In hazardous locations, wiring to be in conduit as shown in Figure 12.2.1.
- When installed in Division 2, “SEALS NOT REQUIRED”

### (3) Operation



#### WARNING

- “OPEN CIRCUIT BEFORE REMOVING COVERS.”
- “SEAL ALL CONDUITS WITHIN 18 INCHES” in hazardous locations.
- When installed in Division 2, “SEALS NOT REQUIRED”
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

### (4) Maintenance and Repair



#### WARNING

The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the approval of Factory Mutual Research Corporation.

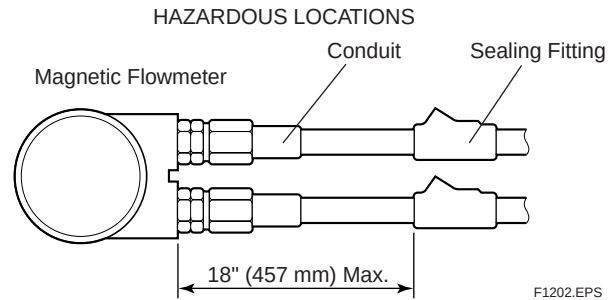


Figure 12.2.1 Conduit Wiring

## 12.3 CSA

### (1) Technical Data

Applicable Standard:

For CSA C22.2 Series;

C22.2 No 0, C22.2 No 0.4, C22.2 No 0.5,  
C22.2 No 25, C22.2 No 30, C22.2 No 94,  
C22.2 No 1010.1

For CSA E79 Series;

CAN/CSA-E79-0, CAN/CSA-E79-1,

Certificate: 1481213

#### For CSA C22.2 Series

Explosion proof for Class I, Division 1,  
Groups A, B, C & D.

Dust-ignition proof for Class II/III, Division 1,  
Groups E, F & G.

“SEAL ALL CONDUITS WITHIN 50 cm OF THE  
ENCLOSURE”

“WHEN INSTALLED IN DIV. 2, SEALS NOT  
REQUIRED”

Maximum power supply voltage: 250 VAC/130 VDC

Excitation Circuit: 140 V max

Enclosure: Type 4X

Temperature Code: T6

Ambient Temp.: -40 °C to +60 °C (-40 °F to  
+140 °F)

#### For CSA E79 Series

Flameproof for Zone 1, Ex d IIC T6

Maximum power supply voltage: 250 VAC/130 VDC

Excitation Circuit: 140 V max

Enclosure: IP66, IP67

Temperature Code: T6

Ambient Temp.: -40 °C to +60 °C (-40 °F to  
+140 °F)

### (2) Installation

#### For CSA C22.2 Series



#### WARNING

- All wiring shall comply with Canadian Electrical Code Part I and Local Electrical Codes.
- In hazardous location, wiring shall be in conduit as shown in Figure 12.3.1.

**WARNING :** SEAL ALL CONDUITS WITHIN 50cm  
OF THE ENCLOSURE’.  
UN SCÈLEMENT DOIT ÊTRE  
INSTALLÉ À MOINS DE 50cm DU  
BOÎTIER.

- When installed in Division 2, “SEALS NOT  
REQUIRED”

#### For CSA E79 Series



#### WARNING

- All wiring shall comply with local installation requirements and local electrical code.
- In hazardous locations, the cable entry devices shall be of a certified flame proof type, suitable for the conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flame proof certified blanking elements. (The plug attached is flame proof certified.)

### (3) Operation

#### For CSA C22.2 Series



#### WARNING

**WARNING :** OPEN CIRCUIT BEFORE REMOV-  
ING COVER.OUVRIER LE CIRCUIT  
AVANT D'ENLEVER LE COUVERCLE.

- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous location.

#### For CSA E79 Series



#### WARNING

**WARNING :** AFTER DE-ENERGIZING, DELAY 20  
MINUTES BEFORE OPENING.  
APRÈS POWER-OFF, ATTENDRE  
20 MINUTES AVANT D'OUVRIER.

- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

### (4) Maintenance and Repair



#### WARNING

The instrument modification or parts replacement by other than authorized representative of YOKOGAWA Electric Corporation or YOKOGAWA Corporation of AMERICA is prohibited and will void Canadian Standards Explosionproof Certification.

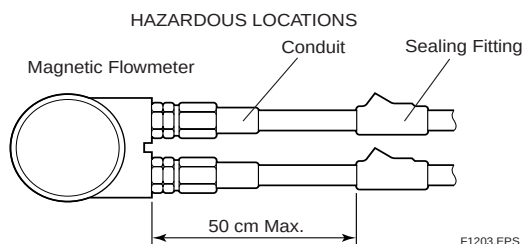


Figure 12.3.1 Conduit Wiring

## 12.4 IECEx



### WARNING

Only trained persons use this instrument in industrial locations.

#### (1) Technical Data

Applicable Standard:

IEC60079-0: 2004, IEC60079-1: 2003,

IEC61241-0: 2004, IEC61241-1: 2004,

IEC60529: 1999 + Edition 2.1: 2001

Certificate: IECEx KEM 05.0018

#### IECEx Flameproof Type

Ex d IIC T6

Maximum power supply voltage: 250 Vac/130

Vdc

Enclosure: IP66, IP67

Ambient Temp.: -40°C to +60°C (-40°F to +140°F)

#### IECEx Type of Protection "Dust"

Ex tD A21 IP6x T95°C

Maximum power supply voltage: 250 Vac/130 Vdc

Excitation Circuit: 140V max

Enclosure: IP66, IP67

Maximum surface temperature: T95°C (+203°F)

Ambient Temp.: -40°C to +60°C (-40°F to +140°F)

#### (2) Installation



### WARNING

- All wiring shall comply with local installation requirements and local electrical code.
- In hazardous locations, the cable entry devices shall be of a certified IECEx flameproof type, suitable for the conditions of use and correctly installed.
- Unused apertures shall be closed with suitable flameproof certified blanking elements. (The plug attached is certified as the flameproof and IP66 or IP67 as a part of this apparatus.)
- In case of ANSI 1/2 NPT plug, ANSI hexagonal wrench should be applied to screw in.

#### 3) Operation



### WARNING

- After de-energizing, delay 20 minutes before opening.
- Take care not to generate mechanical spark when access to the instrument and peripheral devices in hazardous locations.

#### (4) Maintenance and Repair



### WARNING

The instrument modification or parts replacement by other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the certification.

|                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>YOKOGAWA HEADQUARTERS</b><br/>           9-32, Nakacho 2-chome,<br/>           Musashinoshi<br/>           Tokyo 180<br/>           Japan<br/>           Tel. (81)-422-52-5535<br/>           Fax (81)-422-55-1202<br/>           E-mail: <a href="mailto:webinfo@mls.yokogawa.co.jp">webinfo@mls.yokogawa.co.jp</a><br/> <a href="http://www.yokogawa.com">www.yokogawa.com</a></p> | <p><b>YOKOGAWA CORPORATION OF AMERICA</b><br/>           2 Dart Road<br/>           Newnan GA 30265<br/>           United States<br/>           Tel. (1)-770-253-7000<br/>           Fax (1)-770-251-2088<br/>           E-mail: <a href="mailto:info@yca.com">info@yca.com</a><br/> <a href="http://www.yca.com">www.yca.com</a></p>                            | <p>Yokogawa has an extensive sales and distribution network.<br/>           Please refer to the European web-site (<a href="http://www.yokogawa-europe.com">www.yokogawa-europe.com</a>) to contact your nearest representative.</p>                                                       |
| <p><b>YOKOGAWA EUROPE B.V.</b><br/>           Databankweg 20<br/>           3821 AL AMERSFOORT<br/>           The Netherlands<br/>           Tel. +31-33-4641 611<br/>           Fax +31-33-4641 610<br/>           E-mail: <a href="mailto:info@nl.yokogawa.com">info@nl.yokogawa.com</a><br/> <a href="http://www.yokogawa.com/eu">www.yokogawa.com/eu</a></p>                           | <p><b>YOKOGAWA ELECTRIC ASIA Pte. Ltd.</b><br/>           5 Bedok South Road<br/>           Singapore 469270<br/>           Singapore<br/>           Tel. (65)-241-9933<br/>           Fax (65)-241-2606<br/>           E-mail: <a href="mailto:webinfo@yas.com.sg">webinfo@yas.com.sg</a><br/> <a href="http://www.yokogawa.com.sg">www.yokogawa.com.sg</a></p> | <p>Manufactured by: or Produced by :<br/>           Yokogawa Electric Corporation<br/>           2-9-32 Nakacho<br/>           Musashino-Shi; Tokyo 180<br/>           Japan<br/>           RotaYokogawa<br/>           Rheinstr. 8<br/>           D-79664 Wehr<br/>           Germany</p> |
| <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: right;">  </div> </div>                                                                                 |                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                            |